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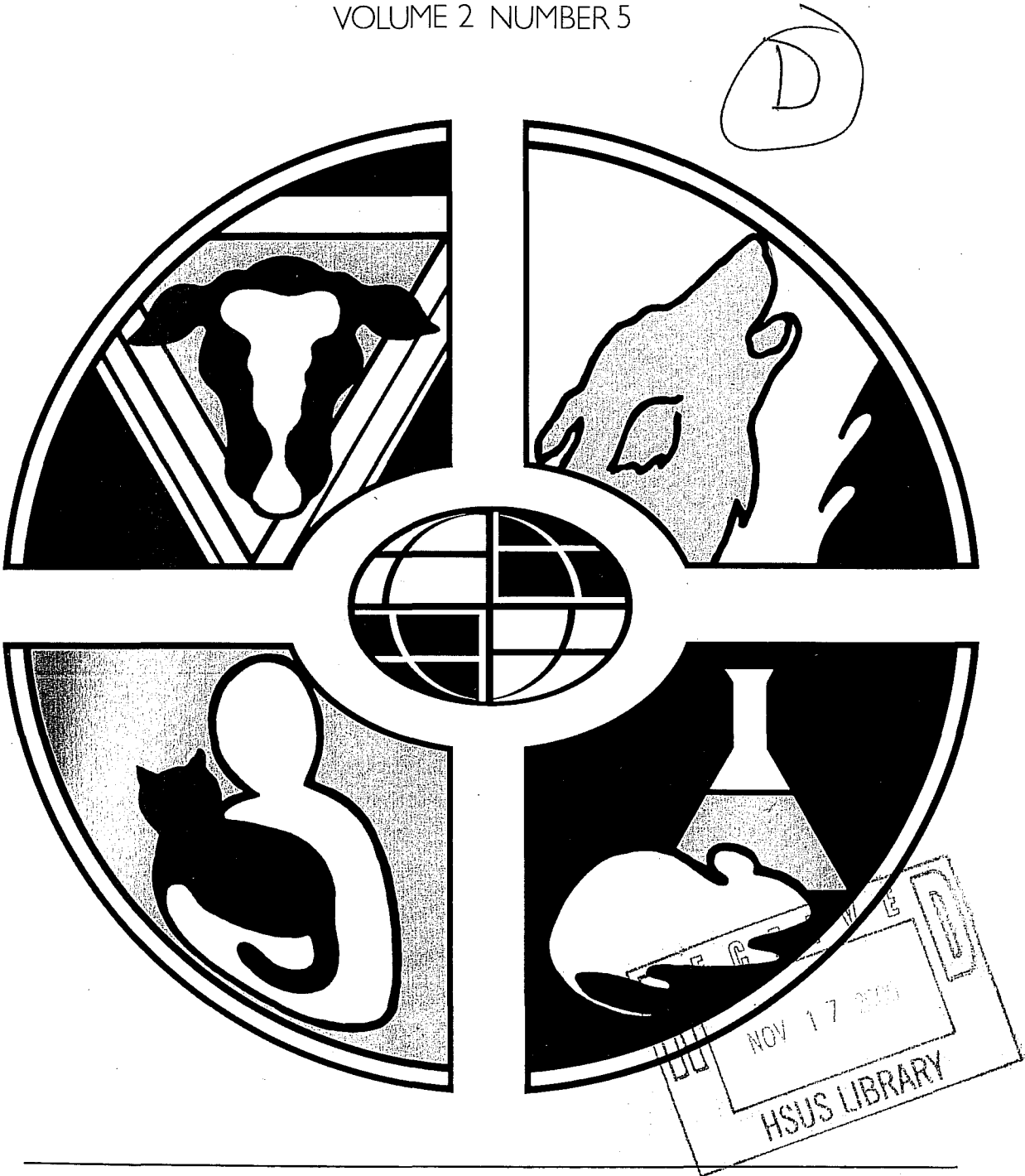
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# International Journal for the Study of Animal Problems

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# Letters

## Author Responds to Review

A review of my book, *Alternatives to Pain in Experiments on Animals*, recently appeared in your journal (Volume 2(3):159-161, 1981). I appreciate the reviewer's favorable comments and have benefited from several of his corrections, for instance that the Ames Test identifies mutagenic chemicals but not tumorigenic cells. I was also mistaken in saying that Chemie-Gruenthal, the manufacturer of thalidomide, was acquitted when on trial for inadequate testing of the drug, when in fact they settled out of court. My three paragraphs over-condensed a complicated case, but my main point was that animal testing is often misleading. As I said, the testing of human embryonic material, as in the Lash and Saxen experiment, could have demonstrated the teratogenic potential of thalidomide.

While I should prefer to maintain a "dignified silence" rather than to indulge in peevish rebuttal with your reviewer, I cannot resist one or two comments. I did not in fact confuse the two British Committees CIAR and CRAE: the CIAR report I cited appeared in a CRAE publication. CRAE was my authority for the statement that the number of animals in Britain used in acute toxicity testing in 1975 was about one million, disagreeing with the reviewer's contention of one million in *all* toxicity testing.

There are several other points which represent an arguable difference in emphasis, and several which, again, are the result of too much condensing of complex scientific data. For the latter I sincerely apologize to my readers, since my aim is to make these matters clearer, not add to the confusion which exists both in the public mind and, indeed, in the way many experiments are reported.

*Dallas Pratt, MD  
228 E. 49th St.  
New York, NY 10017*

## "Harvest" of Monkeys in Breeding Colonies

The editing of my manuscript, "Breeding and use of nonhuman primates in the U.S.A.," which was published in your journal in January 1981(2(1):27-37) produced an error in meaning which I should like to correct for the record. My original manuscript, in the section dealing with the rhesus monkey colony on Cayo Santiago, Puerto Rico, states: "A colony of approximately 800 animals is maintained with a daily supplemental provision of food and fresh water. The colony has been highly successful over the years. To maintain the desired population of 800 monkeys, surplus animals produced on the island are harvested periodically." In the published version, it says: "This highly successful colony has been maintained at a population of approximately 800 with a daily supplemental provision of food and fresh water and killing of surplus animals."

The animals, which have been harvested over the years, have been sent to various zoos, production colonies, and research institutions. The editorial change gives a completely different meaning and indicates a waste of an important national biomedical research resource.

*Joe R. Held, DVM  
National Institutes of Health  
Bethesda, MD 20205*

We regret that this error was not caught by the author or by us before the article went into print. However, we feel bound to point out that "harvest" has become a confusing term when used in relation to animals: In some contexts, it has functioned as a euphemism for "kill." Unfortunately, we did not know that the word was being used in Dr. Held's article (and in his letter) to mean "collect," and we are grateful to Dr. Held for setting the record straight. — Ed.

## Monkey Housing: Every Litter Bit Helps

Pleased as I am by the acknowledgment paid by Dr. Rowan to the University of Stirling's use of woodchip litter in monkey housing (2(3):113, 1981), I cannot take credit for it. A.S. Chamove introduced the innovation, and, with a postgraduate student, made a thorough study of its effects (Chamove and Anderson, 1979).

It is worthwhile elaborating on some of their findings, as several advantages of the system emerged:

*Hygiene:* The woodchip litter condition resulted in less contact with excreta than did the normal bare-floor condition. The monkeys on litter have cleaner coats and observation windows remain less soiled.

*Behavior:* Of the various effects, perhaps the most important is that aggression is reduced by a factor of 5 in the litter condition.

*Cost:* Counting the cost of the litter itself, the litter condition is twice as economical since cleaning time is cut by almost 60%.

*Odor:* The litter condition is less offensive, as judged by a smell-test, than the bare-floor condition, even after 6 weeks without changing the woodchips.

In summary, after 40 months of continuous use to date, no harmful effects have emerged. The benefits are obvious.

W.C. McGrew  
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## Livestock Abuse in Trucks and Sale Yards

In my opinion, the number one animal welfare problem in the U.S. is the abuse of livestock during transportation and while they are passing through mar-

keting facilities. The problem is greatest in the southeastern, south central and southwestern regions of the country. Most of the abuses which occur are already outlawed under existing federal, state, city and county anti-cruelty and humane laws. The problem is that the laws are not being enforced.

I have witnessed deliberate cruelty occurring on a regular basis in many livestock operations. Based on my extensive travels throughout the U.S., I estimate that 10 to 15% of livestock markets, feedlots, ranches and slaughter plants are allowing gross cruelty to occur. These are not isolated incidents. Specific examples of abuses include kicking mother cows in the face with spurs; hitting calves at a sale barn with boards with nails in them; trucks with broken floors; slamming heavy overhead gates on the backs of cattle; over-powered hydraulic squeeze chutes. This resulted in rupturing the animal internally. Hydraulic squeeze chutes are safe handling devices if used correctly (Grandin 1977, 1980a).

Physical abuse and poor husbandry practices cost the livestock industry money. Stopping these abuses would save the industry millions of dollars annually by reducing death losses, sickness, loss of weight gains and bruises. Why are these abuses allowed to continue? The cattle industry is segmented. The basic segments in the southern regions are rancher, local auction, trucker, order buyer barn, trucker, feedlot, trucker and finally the slaughter plants.

Each person along the marketing chain simply passes the death losses, bruises and sickness to the next person in the chain (Grandin 1980b). The cattle industry as a whole loses money. Each individual along the chain collects his money, but he does not see the losses come directly out of his pocket. Losses are also tolerated for tax and other financial reasons.

Here are some typical examples of passed-on losses: A small rancher in the Southeast is not going to vaccinate, dehorn, castrate and prewean his young

calves unless he receives a premium price for preconditioned calves. One survey indicated that 34 to 45% of the feeder calves arriving in southwestern feedlots have to be castrated upon arrival at the feedlot. A sale barn is not going to be motivated to hire better livestock handlers unless they received a premium price in their barn. Feeding grain at the sale barn can reduce death losses. The problem is that somebody has to be willing to pay for the more expensive feed. Trucking losses could be reduced by paying drivers bonuses for low death and injury losses. This works well for hog truck drivers.

In another survey (Grandin 1981), producers who sold their cattle to the slaughter plant on a live weight basis had almost twice as many bruises compared to producers who sold their cattle on a carcass basis. The producer gets bruises deducted from his check when cattle are sold on a carcass basis. Observations also indicated that when the feedlot and the slaughter plant are owned by the same people, the handling of the livestock is better. The losses cannot be passed on in this situation.

*Temple Grandin  
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## Information Sought

The Institute for the Study of Animal Problems is seeking papers, anecdotal material, preliminary observations, unpublished research data and arguments on the following topics:

**Breeding of Wild Animals in Captivity**—We would like to examine ethical and practical issues, such as the type and degree of constraint which are or should be placed on breeding nonhuman primates for research, or the role of zoos as "genetic reservoirs" for endangered species.

**Cross-Cultural Comparisons of Human Attitudes Toward Animals**—We would like to collect ethological and anthropological data on how people in subsistence economies interact with their domestic animals and with wildlife. For example, sub-Saharan Fulani tribesmen control their cattle through the use of touch, in contrast to, say, the Western roundup. How do such differences affect the character of the human/animal bond?

**Productivity as a Measure of Farm Animal Welfare**—We are interested in the question of how the economies of scale which govern modern intensive systems of animal farming affect evaluation of the individual animal's welfare. In addition, does individual productivity reflect individual welfare?

**Use of Animals in Psychological Research**—We encourage comments on and data illuminating the basic psychologist's paradox: If the human psyche is an important parameter in moral considerations, then the better the animal is at modelling the human psyche, the greater consideration it must be paid as an object of moral concern.

Please send all material to the Institute for the Study of Animal Problems, 2100 L St., NW, Washington, DC 20037, Attention: TTD.

# Regulation of Biomedical Research

Andrew N. Rowan

The idea of abolishing or simplifying government regulations has a large following in Washington at the moment. As Reagan and his minions start to prune the growth of the past twenty years, we must hope that they are able to distinguish between the healthy growth which provides needed support and the unnecessary growth which strangles necessary initiatives. However, there is one area where we need more regulation rather than less, namely, biomedical research. In calling for more regulation in biomedical research, I do not mean the imposition of outside controls by allegedly ignorant and insensitive bureaucrats (although I think some outside control is unfortunately necessary), but rather the control which scientists themselves are meant to exercise over their work. I am calling for more attention to the regulation and control of experimental variables, such control being ever more important as the questions asked probe deeper and deeper into the subtle workings of biological systems.

In the 1940s, several researchers investigated environmental factors affecting various pharmacological parameters. Chen and colleagues (1943) demonstrated that the potency of insulin increased 40-fold from 20°-40°C, while the variance (square of the standard deviation) dropped over 4000-fold. Chance (1947) showed that the toxicity of an amphetamine varied according to the number of mice housed together, the toxicity for ten mice housed together being one tenth that for solitary animals. Others have followed the example set by these studies and have attempted to assess the effects of various environmental and stress-producing factors and their possible consequences for research (See *News and Review*).

In metabolic biochemistry, a warning was sounded by a group of German scientists for those who use *in vivo* metabolite levels to study regulatory mechanisms (Faupel *et al.*, 1972). In an elegant study, the metabolite levels of rat liver were measured using the standard "freeze-clamping" technique in which tissue is frozen to -193°C virtually instantaneously by clamping between aluminum plates which are pre-cooled in liquid nitrogen. However, with this technique, there is either an appreciable delay (greater than 10 seconds) in removing tissue from the killed animal, or the animal is anesthetized so that the tissue can be frozen *in situ* before the animal is killed. The possible effects of the delay, killing methods or anesthesia are usually ignored because of the problems of control. Faupel and his colleagues, using a simple double guillotine and rats that were in an unstressed state, showed that anesthetics, stress and violent killing techniques caused important variation in the levels of certain critical metabolites, such as adenosine monophosphate. By doing so, they called into question a great deal of earlier work and sounded a warning for anyone not taking these factors into account. Yet their study either is perceived to be an interesting curiosity or is ignored. The extra care which would be required is more than most researchers are willing to entertain, and they would probably argue that such extra control is not a requisite for the success of their particular research.

According to a recent article in *Science* 80 (December, 1980), the circadian rhythm is also very important, as an animal's response to a particular stimulant or drug treatment varies in a regular manner according to the time of day. For example, an LD50 dose of phenobarbital will kill no rats at the most favorable period during the day, but all will die if dosed during the least favorable period. Chronobiologists (those studying the consequences of diurnal and other regular biological rhythms) now argue that the results of some previous drug and cancer research studies are dubious; that many toxicology studies, especially of behavioral toxicity, need to be redone and that the conduct of scientific research must include controls for these time-dependent changes in all future studies.



The issue of stress effects has already been mentioned with regard to the study by Faupel and his colleagues. However, there are many such studies and there are probably few researchers who do not recognize that stress can adversely affect experimental results. Dr. W. Isaac (University of Georgia) discussed this issue at the 1979 annual conference of the American Association for Laboratory Animal Science, but argued that "we have not been concerned with behavioral variables, even though we give it a great deal of lip service and write regulations dealing with behavioral variables." He noted that there is little reinforcement for studies on the effects of environmental variables and no real commitment to attempt to control for them. A recent study on the response of rats to the stress of handling (moving the cages about) reports that a wide variety of metabolic and endocrinological parameters were markedly affected (Gärtner *et al.*, 1980). The authors note that "experimental or sampling procedures must be performed within 11 seconds of first touching the animals' cage." This is important for most of the endocrine characteristics and for all plasma values which are linked with circulatory change, capillary permeability, energy and mineral metabolism, and acid-base balance. If the experimenter is unable to perform the procedures quickly enough, "he must explain in detail how the stress due to manipulation influences the characteristics being studied." (*Emphasis added.*)

While this may be interesting, and the possible implications for results from past research disturbing, what does it have to do with animal welfare? Opponents of animal research commonly charge that experiments are repeated endlessly, while scientists argue that one must check the results of other research. But it is clear that a large amount of research is done without adequate control of the variables described above. This means that much of it may have to be repeated merely to control for the proper variables. While it may not be legitimate for animal welfare advocates to call for an end to all duplication of animal research, it is certainly legitimate for them to demand that scientists consider proposed research protocols far more carefully and that they take into account the factors mentioned above. Too many scientists follow, either wholly or in part, the dictum "Why think when one can experiment?" Such an approach is neither good economics nor good science. It has absolutely nothing to do with academic freedom, only with academic license.

Some would argue that the peer review system will prevent poorly planned research from being funded. But this is not necessarily true since the peers reviewing the research proposals are, by definition, guilty of the same omissions. Why should they pick up on a fault which they do not recognize in their own research? Of course, there will be some research projects which need not be concerned about environmental or chronobiological factors, but animal researchers should argue why they do not need to control for such variables, rather than the reverse.

The above proposals to take these additional variables into account will, no doubt, be perceived by many as irksome and unnecessary, but anyone interested in both promoting good science and preventing unnecessary repetition of animal research should demand such increased control. Blind empiricism should be forced out of biomedical laboratories, and we should instead strive toward the sort of research that was undertaken by Charles Nicolle, the French bacteriologist (Zinsser, 1940):

*Nicolle did relatively few and simple experiments, but every time he did one, it was the result of long hours of intellectual incubation, during which all possible variants had been considered and were allowed for in the final tests. Then he went straight to the point, without wasted motion. That was the method of Pasteur, as it has been of all the really great men of our call-*

ing, whose simple, conclusive experiments are a joy to those able to appreciate them.

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## Is Nature Our Birthright?

Nancy Heneson

On December 2, 1980, former President Jimmy Carter signed into law the Alaska National Interest Lands Conservation Act, which will protect 104 million acres of federal land in Alaska (although mineral surveys will be allowed on protected areas where there may be oil and gas). In the words of former Interior Secretary Cecil Andrus (*DOI News Release*, 2 December 1980): "This law is the culmination of a nine-year national effort to protect the awesome wonders of our largest state as a part of a great legacy of beauty and nature that is the birthright of every American."

Webster's Third New International Dictionary (1976) defines "birthright" as a "right, privilege or possession to which a person is entitled by birth (as an estate or as civil liberty guaranteed under a constitution)." Leaving aside in this case the fact that dictionary definitions are often inadequate conveyors of a word's subtler connotations, the use of the legalistic term "birthright" in connection with beauty and nature reified as land bears closer examination, not only for its lexical peculiarity, but in its role as the linguistic vessel for transmission of a long-cherished idea. The concept of nature as something to which we (especially Americans) have a right, something that is our "legacy" or our "national heritage," manifests itself in the arguments of both developers and conservationists, hunters and trappers and animal protectionists. It has been used to justify manipulation, exploitation and destruction of life as well as to bolster efforts to establish parks, wilderness preserves and wildlife refuges. That such contrary attitudes toward the land and all of its inhabitants should be rooted in some of the same ideological soil is neither surprising nor illogical when one considers that the idea of rights, privileges and possessions presupposes the idea of ownership; ownership implies power, and power can be wielded either to the subjective benefit or detriment of the parties involved, including in this case that which is owned. Whether ownership adopts the philosophy of ruthless exploitation, benevolent stewardship, or some tortuously reached compromise between the two, follows from and is secondary to the deeply-ingrained idea that nature *belongs* to the human species.

By virtue of the Alaska Lands Act, some land in Alaska now belongs to the federal government, some to the state and some to native Alaskans. If someone, anyone, native Alaskan subsistence hunter, oil developer, or Washington environmental

lobbyist stands on Alaskan land, surveys its beauty, and is overwhelmed with a sense of legacy, birthright or national heritage, should these emotions be construed as the foundation of how we live on and with the land? One could simply accuse Secretary Andrus of waxing poetic — after all, the law is an end product of nine years of *Realpolitik* and not the spontaneous expression of an intuitively-felt relationship to nature. Yet the idea is so widely held and its implications are so various, that it is hardly ever called into question as an assumption. Indeed, it is treated as a guiding principle: Zoos are justified on the grounds that we must preserve wild animals for our children to see, that what was our possession must be theirs as well. Strip mining, shale oil extraction and clear-cutting of forests are justified (formerly tacitly; now under Secretary Watt with a kind of bellicose glee) on the grounds that the land must give up what it holds to us because the land is ours.

The Janus-faced quality of the idea of owning nature reveals itself most clearly, however, in the opposition to such dominionistic attitudes. Those who view the role of human beings as stewards rather than rulers of nature have interposed moral responsibility between our undeniable power to alter and destroy the environment (habitats and species) and the indiscriminate wielding of this power for economic gain, in the pursuit of knowledge, or in the name of an ideology. The distinction between these two approaches to nature lies in each demanding a different set of choices with different outcomes. The philosophy of benevolent stewardship, esthetically preferable though it may be, still sets human beings apart from and above the rest of nature by virtue of their ability to make moral decisions.

The U.S. Endangered Species Act, in some ways a legislative model of benevolent stewardship, mandates the use of all possible methods to conserve species that are determined to be threatened with extinction. But what happens when these methods, in the judgment of the interested party, succeed, *i.e.*, bring the population back to a level where it is no longer “threatened?” The pendulum is then allowed to swing in the other direction, as illustrated by the recent decision of the U.S. Department of Interior to lift the 6-year ban on commercial importation of kangaroo products. A DOI press release dated 28 April 1981 states: “The decision was based on evidence that the three largest kangaroo species have reached healthy numbers and are being properly managed in Australia.” However, the evidence was apparently not convincing enough for the DOI both to open the kangaroos to trade *and* take them off the official list of threatened species, a contradiction which has caused much ire and frustration among animal welfare and conservation groups. Yet even if data could be gathered that would satisfy everyone that the kangaroos are not presently threatened with extinction, it would not change the fact that built into the Act is the idea of manipulation and control of species for human self-interest, be it motivated by economics or moral philosophy.

It is of course impossible to escape the notion of self-interest in our relationship with nature. In fact, it is “unnatural,” if one understands (and, one is forced to say nowadays, believes in) evolution. However, there is no real justification for either disguising this as stewardship or perverting it into dominionism. Every organism has an impact on the environment, and it is not only idealistic but biologically nonsensical to argue that we should leave everything alone. However, when decisions on policy are made which direct the future use of land, plants and animals, at least let the rationale not be shrouded in a popular but essentially false equation of nature with a possession, a legacy or a right. What we do to or for the land, we do out of self-interest, enlightened or not, and not to fulfill an inherited right. There are some things, no matter to what degree we enslave them, that can never be truly owned.

# News & Review

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## Sea Turtle Excluder Device

The world's seven species of sea turtle have been in trouble the last few decades for a number of reasons and from a number of causes. Turtles are slaughtered for their meat, skin, shells, and other "products"; their eggs are poached and their habitat threatened. Conservation of the sea turtle has to be a global effort, not only because the turtles distribute themselves across thousands of miles, but also because their economic value has thrust them onto the international wildlife market. However, local problems also exist, such as the one affecting three species of sea turtle and the shrimping industry along the South Atlantic and Gulf coasts of the United States. Trawls designed to catch shrimp have also been netting and drowning loggerhead sea turtles, as well as some Kemp's (Atlantic) Ridleys and greens (the most endangered species of sea turtle).

In November 1979, experts gathered at the State Department in Washington, DC to discuss strategies for conserving the sea turtle. One workshop, led by Milt Kaufmann, President of Monitor International (a consortium of environmental and animal welfare groups), concentrated on the problem of incidental catch of sea turtles by shrimp fishermen. According to Kaufmann, the shrimping industry had been denying for years any relationship between the drowning deaths of otherwise uninjured sea turtles and trawling operations in the vicinity. The workshop ultimately produced an official recommendation to establish an observation and salvaging network for the turtles so that hard data on mortality could be collected to clarify anecdotal information and the resultant accusations and denials. By August 1980, at a meeting of conservationists, fishermen and state and federal officials in Charleston, South Carolina, a spokesman for the shrimping industry was ready to agree to the existence of a correlation between

trawling activity and sea turtle mortality. (Data taken in 1980 revealed that 2,085 sea turtle carcasses washed ashore along the Gulf and South Atlantic coasts 2-4 days after the completion of shrimping operations in the area.)

At this same meeting, participants reached a consensus on the best methods for reviving netted sea turtles, and highly specific emergency regulations for fishermen on resuscitation were later published. However, attempting to resuscitate captured turtles before putting them back into the sea is at best a last-ditch measure to counteract rather than solve the problem, i.e., the unintentional capture of the turtles by the trawl nets.

The National Marine Fisheries Service (U.S. Department of Interior) has been working on several approaches to conserving, protecting and restoring sea turtle populations for the past six years. In addition to its efforts to acquire basic information on the life history of the sea turtle, designate critical habitats and establish restricted fishing areas, the NMFS has also directed research into and development of "excluder gear," structural modifications which can be added to shrimp trawls to make them turtle-proof. With one failure behind it (an "excluder panel" that excluded shrimp as well as turtles), the NMFS has gone on to develop and perfect the Turtle Excluder Device (TED), in essence a trap door set in a frame constructed of galvanized pipe which is placed inside the trawl at the intersection of the trawl body and bag. When a turtle or other large object enters the bag, it strikes slanted bars that are joined to the frame, and is forced toward the hinged trap door, which opens when a pre-set tension is exceeded. Turtles are thus released into the sea, while shrimp, being small enough, pass through the bars and remain in the bag.

Field tests of the TED in the South Atlantic during 1980 produced impressive results. Cooperating vessels

reported an 89% reduction in sea turtle capture, with shrimp catch virtually equal to that of vessels operating with standard trawls. Milt Kaufmann, who is also the Fund for Animals' Director of the International Program for Marine Mammals and Endangered Species, is "very optimistic" about the TED, particularly since the device has been further refined, with the trap door at the top rather than at the bottom. This arrangement takes advantage of the fact that the air-breathing sea turtles naturally make for the surface, and the force of the water re-closes the door, eliminating the need for the elastic cords that had been used to pull the door back into position.

Enthusiasm for the TED does not run as high among members of the shrimping industry, however. Although the development of the TED was a joint effort of the industry and the NMFS (Eddie Toomer, the captain of one shrimp-vessel, has been singled out for appreciation by the NMFS for his "innovative ideas and enthusiastic support."), the prospect of government regulations requiring the use of the TED is most unwelcome. Jim Sternberg, of the Council on Environmental Education's Sea Turtle Rescue Fund, noted "limited receptivity" among shrimp fishermen in the southeastern coastal states to government-sponsored workshops set up to promote the TED. Those who remain less than enamored of the TED argue that it is too awkward, costs too much (\$200 per trawl, according to Kaufmann) and harms the shrimp catch, contrary to the statements of the NMFS on the TED's performance during field trials. The industry has also pointed out that although it is the target of regulation, shrimping is not the only type of fishing operation that may be adversely affecting sea turtles: Bottom trawls are used to catch flounder as well as shrimp, and the standing nets used in sturgeon fishing can also ensnare larger sea-dwelling animals.

At one stage, the proposed regulations included a choice of using the turtle excluder or limiting trawling time to 90 minutes instead of the usual several

hours. However, this latter option was judged unenforceable owing to the tremendous impracticality of trying to monitor tens of thousands of shrimping vessels. Thus the regulations will most likely require adoption of the TED. After pouring \$1 million into research and development of the TED, the NMFS must now contend with an industry that is hostile to the changes its use would entail. Jim Sternberg suspects that the current reluctance of the NMFS to admit any more than a "correlation" between trawling activity and sea turtle mortality stems from the fear that if the industry should decide to sue for over-regulation, the government would be unable to provide enough hard evidence to meet the charge. Indeed, certain basic questions about the animal at the center of this controversy remain unanswered. For example, no one yet knows enough about the reproductive behavior of sea turtles to define the biological and ecological impact of the deaths of loggerheads (most of them immature) in trawling nets. As spokesman for Monitor International and the Fund for Animals, Kaufmann is urging the shrimping industry to adopt the use of the TED voluntarily during the period in which regulations are being ironed out. Given the problems caused by the industry's attitude and by the current lack of hard scientific data on the population dynamics of the sea turtle, the TED may have a long wait between its field trial and widespread use.

### More Action on Draize

The Food and Drug Administration (FDA) is committing funds to a project allowing one of its senior scientists to study a new *in vitro* testing technique. This statement, made by Robert Wetherall, FDA's Associate Commissioner for Legislative Affairs, appeared in a letter to Congressman Bill Green (R-NY), who subsequently entered it into the Congressional Record (15 June, 1981, E2953). Wetherall also provided an assurance to

industry that the FDA would accept results from properly validated alternatives to the Draize test as sufficient evidence of product safety.

The FDA's initiatives follow those of a number of cosmetic companies, including Avon, Estée Lauder, Max Factor, Chanel and Mary Kay, that have contributed various amounts of money to the Cosmetic, Toiletry and Fragrance Association's Ad Hoc Fund on Alternatives. (Avon and Estée Lauder are known to have contributed \$750,000 and \$250,000, respectively.) The CTFA is now soliciting proposals from organizations interested in managing this fund.

The FDA is a member of the Inter-agency Regulatory Liaison Group (IRLG), along with the Consumer Product Safety Commission (CPSC), the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA) and the Food Safety and Quality Service (FSQS). In the introduction to its recently issued *Recommended Guidelines for Acute Eye Irritation Testing*, the IRLG states: "For humane reasons, substances known to be corrosive may be assumed to be eye irritants and should not be tested in the eye. Furthermore, substances shown to be severe irritants in dermal toxicity tests may be assumed to be eye irritants and need not be tested in the eye." The guideline also suggests that a trial test be done on three rabbits rather than the usual six. If the substance produces severe irritation or no irritation, then no further testing is required. Only if the results are equivocal should another three animals be used.

### **Farm Adverts Lay An Egg**

It is not unusual to see advertisements for meat and other livestock products that feature idyllic barnyard scenes, often with "happy" animals either strolling in the background or actively promoting the products themselves. However, this type of advertising is now being protested in the U.K. following the successful prosecution in France of

three poultry keepers for fraudulent advertising. According to the 13 December 1980 edition of the newspaper *L'Alsace*, the Fraud Squad and the Consumer Bureau of Alsace filed the suit, and the Strasbourg tribunal found the defendants guilty on the basis of the fact that the egg boxes carried a picture of a "natural" country scene, while the eggs actually came from a standard battery cage operation.

In the U.K., however, the controversy has not reached the courts. According to *Ag* (No. 63, May 1981), a number of individuals protested against television spots used by the company of Goldenlay in which its eggs were proclaimed to have "the taste of the country." So far, neither the Independent Broadcasting Authority (IBA) nor the Home Office has been willing to take any action to pull the advertisements. Responding to letters of protest, the IBA stated, "...this is a political matter in which a neutral body such as ourselves cannot participate." The Home Office also invoked the specter of politics, arguing that intervention by the Home Secretary or his representatives would set a dangerous precedent for political interference in program content in general, and tossed the ball back to the IBA, which it called the appointed "guardian of the public interest in relation to their broadcasts."

*Ag* has called on its readers to resist the apparent official runaround by stepping up their protests.

### **British Unions Back Conservation Efforts**

PCAP International (Protection and Conservation of Animals and Plantlife) has secured the support of the British trade union movement in its opposition to the import and export of endangered species of animals and plants, according to recent information from Daniel Lindsay, PCAP's European Secretary. In particular, Dennis Kelly, Secretary of the Liverpool Dockers' Shop Steward Joint Committee, has assured Lindsay that

dockers in Liverpool and Glasgow will refuse to handle all shipments of oil from endangered sperm whales which enter their docks. Dock workers in England have mentioned the possibility of having their counterparts on the Continent cooperate in "blacking" shipments of sperm whale oil, thus (PCAP hopes) upsetting trade to the point where firms would be forced to substitute jojoba oil, an adequate and presently available plant product.

In another action, PCAP is campaigning to enlist the trade unions in its efforts to prevent the dumping of nuclear waste into the sea. Whereas the United States, Norway, Sweden and other countries have ceased this practice, Britain continues to dump on a large scale, raising concern about the concentrations of radioactive material in fish and the long-term effects on marine ecosystems as a whole. PCAP reports that eight major unions and many public figures have expressed their support.

### **Alternative for Rabies Diagnosis**

An alternative to mouse inoculation to confirm a diagnosis of rabies may be available in the form of a tissue culture test, recently evaluated by the New York State Department of Health. According to a report in *Vet Med/SAC* (76:145, 1981), the test, which yields final results in 48 hours, was found to be reliable and comparable in sensitivity to the standard technique of mouse inoculation. (For more information, see the research report in *J Clin Microbiol* 12:590-593, 1980.)

### **NC State Principles for Animal Use**

The following principles for the use of animals were approved by the Cabinet of the new School of Veterinary Medicine at the North Carolina State University (Raleigh) on 5 February 1981. They are reproduced below in full for the information of our readers.

### **Preamble**

The use of animals is essential to teaching programs and biomedical research in a School of Veterinary Medicine. Many significant benefits to the health and welfare of both animals and mankind have resulted from animal use in research and are a matter of historical record. Instruction of students in the professional curriculum of the School of Veterinary Medicine in the arts and sciences of modern diagnostics and therapeutics would also be impossible without the use of some animal models.

At the same time, the use of animals carries with it significant legal obligations for proper care and humane use. More importantly, there is a high moral obligation for the appropriate use of another living animal. This is especially important within a School of Veterinary Medicine because the public looks to, supports, and expects the veterinary medical profession to protect the health and welfare of animals. Therefore, each staff member, student, faculty member, or research investigator of the School of Veterinary Medicine is directly responsible to promote and protect animal welfare within the instructional and research program of the School. This responsibility should be conveyed by example and extends to the education of the future members of our profession.

The purpose of these following principles is to provide guidance for the proper care and humane use of animals within the teaching and research programs of the School.

### **Principles**

1. Animals should be used in teaching and research projects only if their use is required to achieve results which will ultimately benefit society. Statistical analysis, mathematical models, *in vitro* systems, demonstrations, and audiovisual aids should be used whenever feasible to replace or complement animal use and reduce the number of animals needed to achieve significant results.

2. The procurement, care and use of animals in the School of Veterinary Medicine shall be in accordance with

regulations established under the terms of the Animal Welfare Act; all applicable state and local laws; and the National Academy of Science's *Guide for the Care of Laboratory Animals*. The housing, care, feeding, and daily observations of all animals must be supervised by individuals knowledgeable in such matters. At the School of Veterinary Medicine, North Carolina State University these activities are structured under the *Director of Laboratory Animal Resources*.

3. The use of animals should be planned and conducted so as to avoid unnecessary suffering and injury to any animal. Procedures involving live animals must be performed by, or under the immediate supervision of, a faculty or staff member *who is knowledgeable about the procedure*. Students must be instructed in and appropriately supervised for procedures performed by them.

If any experimental or demonstrative procedure, or their consequences, have the potential to produce significant pain, distress or suffering, anesthesia or other appropriate analgesia must be administered. If for any reason pain or distress cannot be obviated, *the procedure in question must be reviewed by the Faculty Committee on Laboratory Animal Resources before it is undertaken*. The requested procedure should be described in writing to the Committee and the Committee will recommend to the *Department Head* whether the procedure should be undertaken. If the matter cannot be resolved in this manner the recommendation will go to the *Dean*.

4. If major surgical, or other invasive procedures, are performed on any animal it should be euthanatized before it recovers from anesthesia unless such recovery is necessary to the research or instructional value of the procedure. Instructional use of animals in surgical procedures should be planned so that if an animal is used for a second major surgical procedure it will be euthanatized prior to recovery from the second anesthesia.

5. When an animal is no longer needed for programs of the School of Veteri-

nary Medicine, it should be euthanatized. An exception is made for animals that have a market value and where transfer to a new owner represents no threat to public or animal health or welfare, or the integrity of the School. Such animals may be sold at fair market value according to the administrative procedures established by the School and the University.

6. When an animal is euthanatized, it must be done in a manner consistent with the recommendations of the AVMA panel on *Euthanasia* (*Journal American Veterinary Medical Association* 173:59-77, July 1, 1978).

7. Any faculty member, staff member, or student of the School of Veterinary Medicine who believes that these principles are being violated may submit a written request to the Faculty Committee on Laboratory Animal Resources for the review of the procedure or situation which results in the alleged violation. The committee will review all pertinent facts regarding the alleged violation and if a violation has occurred, will recommend corrective action to the responsible individuals including the appropriate Department Head. If the matter is not resolved in this manner, the recommendation of the Committee will be forwarded to the Dean of the School of Veterinary Medicine for resolution.

## Need to Control Stress Stressed

The study of the relationship between stress and the competence of the immune system has produced the new discipline of psychoneuroimmunology. As the deliberate, quantitative induction of stress in laboratory animals is an integral part of experimentation in this discipline, it is vital to the accuracy and validity of the data that animals are protected from the unintentional induction of stress through handling and inappropriate environmental conditions. According to researcher Vernon Riley (*Science* 212(4499):1100-1109, 1981),



studies from different labs of the influence of stress (as expressed by increased concentrations of adrenal corticoids in plasma) on neoplastic processes have been plagued by inconsistent results, not only because of the difficulties involved in objectively measuring the physiological manifestations of stress, but also because of the confounding effects of generally unrecognized, and therefore uncontrolled, environmentally-induced stress.

Although it is probably impossible to eliminate physiological changes in laboratory animals associated with handling and environmental factors, one can recognize and attempt to control additional stress by keeping animals under low-stress conditions, which Riley outlines as follows:

(i) No recirculation of noxious air that has been in previous contact with animals; (ii) partial soundproofing of the animal storage shelves; (iii) elimination of animal room vibrations and high-pitched sounds of centrifuges, vacuum cleaners, ventilation fans, and other noisy laboratory or building equipment; (iv) elimination of drafts, air turbulence, and wind-tunnel effects; (v) precise light control to stabilize circadian rhythms and to regulate light intensity exposure; (vi) segregation of males and females with respect to transmissible odors, pheromones, and other stress-inducing signals; (vii) segregation of experimental animals that are experiencing stress from normal or control animals; (viii) introduction of special minimum-stress animal handling techniques and cage-cleaning procedures; and (ix) avoidance of drafty, uncomfortable, and stressful wire-bottom cages. Data also indicate that the isolation of animals, with only one animal per cage, is undesirable.

Mice kept under such low-stress conditions showed baseline values of 0-35 nanograms of corticosterone per ml of plasma, while mice maintained in conventional facilities have values ranging from 150-500 ng/ml. Close proximity

to mice of the opposite sex caused a four- to sevenfold increase in plasma corticosterone, which remained elevated for more than 80 days; male mice were less severely affected than females. In C3H/He female mice, the ability to reject a tumor challenge was depressed when they were housed singly, and in males when housed either singly or in pairs. In contrast, the psychosocial "eustress" of being housed in groups of 3-20 per cage was found to enhance the immunological response to implanted lymphosarcoma. In another experiment, mice carrying the mammary tumor virus (MTV) were housed in 3 groups: two in a conventional and one in a low-stress facility. The former two groups, exposed to considerable environmental stress, showed 92% and 68% tumor incidence respectively, compared to less than 10% incidence in the low-stress group. Riley concludes:

*The influences of uncontrolled stress in animal studies, particularly in studies with rodents, call for (i) a more universal consideration of these factors in the design of experiments; (ii) establishment of a low-stress environment for animal housing; (iii) special considerations in the manipulation and handling of experimental animals; and (iv) attention to time factors in terms of minutes, when blood samples are being removed for the establishment of meaningful corticosterone and related values. Because of these largely unappreciated and uncontrolled elements, the question arises as to how much of the present and past work with small animals may be severely flawed. In any event, the information now available calls for a reassessment of the current standards for laboratory animal housing and for techniques related to animal experimentation.*

*I found, somewhat to my amusement... that animals always behave in a manner showing the rightness of the philosophy entertained by the man who observes them. —Bertrand Russell*

# History of Animal Experimentation Control in the U.K.

Dr. Judith E. Hampson

The legislative control of the use of animals in experiments in the UK lies in the *Cruelty to Animals Act* of 1876. Animal Welfare groups and individuals in Britain have pressed for reform of this law almost since its inception 105 years ago, and the British government has recently agreed to bring this legislation up to date. Any new or amended legislation could have far-reaching implications, both for laboratory animal welfare and upon the scientific community and is therefore of considerable importance both in this country and overseas. No proper appreciation of the problem would be possible without reference to the historical background.

The Act of 1876 did not go far enough to satisfy all those humanitarians who had originally campaigned for legislation to control experimentation. Agitation over experimentation in Britain began in the mid-nineteenth century. Strong feelings were aroused largely as a result of certain experiments which were taking place in France and Germany. In 1822 Magendie, sometimes described as the father of experimental physiology, demonstrated the sensory and motor functions of the dorsal and ventral spinal nerve roots in unanaesthetized dogs. These experiments were to become the center of a drawn-out and heated controversy, not only because of the cruel nature of the work itself, but also because Magendie's theory was hotly disputed by Sir Charles Bell in England. Bell, antipathetic to experimentation, drew his inferences from anatomy. The stage was set for debate, not only about the ethics of vivisection, but also its utility.

Magendie's insistence upon experimentation strongly influenced his pupil Claude Bernard, who was to claim the credit for raising the 'art' of medicine from empiricism to the status of a truly experimental science. While his somewhat subjective dabblings in ethical philosophy could be seriously challenged, his scientific methodology was sound. In his classic *Introduction to the Study of Experimental Medicine* he firmly set out the principles of the experimental method and their application to the 'new sciences' of physiology and medicine. It soon became clear to humanitarians, as the method was put into practice, that what was at issue was not simply isolated cases of animal abuse, but a whole new trend in science which was, by definition, to claim living animals as legitimate experimental tools.

During the early part of the nineteenth century, as physiology became institutionalized in France and Germany, British scientists were reluctant to take up the new method. In Britain, the medical profession lent considerable support to humanitarian protests against Continental research and teaching methods. For example, the surgical mutilation of unanaesthetized horses by students practicing their skills in French veterinary schools was strongly criticized by both the British medical press and the Royal Society for the Prevention of Cruelty to Animals (RSPCA). Official RSPCA policy was that experiments under full anaesthesia were permissible, whereas painful experiments were not.

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The British antivivisection movement really started in the 1860's. Frances Power Cobbe, who was to found the first antivivisection society, began active campaigning against the infamous practices carried out at the Physiological Institute in Florence by Professor Moritz Schiff, a pupil of Claude Bernard. Attempts by Cobbe and her friends in the Anglo-American literary circle to persuade Schiff to desist from these activities did not succeed, but on her return to England Cobbe continued her fight against vivisection. British scientists, however, were not unaware of the ethical controversies surrounding their work and in 1871 the British Association for the Advancement of Science drew up a 'moral code' which gave guidelines for those experimenting on living animals.

However, in 1874, an event occurred which was to have a devastating impact. At the first meeting of the British Medical Association in Norwich, another former pupil of Claude Bernard, French physiologist Eugene Magnan gave a lurid display of the differential effects of alcohol and absinthe by injecting them into the veins of two dogs. The dog injected with absinthe died. Heated protests were raised in the audience at the time and subsequently John Colam, then Secretary of the RSPCA, instituted proceedings against Magnan and the three Norwich doctors who had assisted him, under the Cruelty to Animals Prevention Act, 1849. The prosecution failed because Magnan had, by that time, returned to Paris and there was insufficient evidence against the three British doctors. The Magistrates, however, concluded that the RSPCA had been justified in bringing the proceedings. The trial became important in three respects: It illustrated to the medical profession that its members were open to prosecution under existing legislation; it stirred up considerable public controversy and it illustrated to humanitarians that existing legislation was inadequate, at least in relation to animal experimentation.

Thus it became clear to the humane movement and scientists alike, if for diametrically opposed reasons, that a law dealing specifically with the protection of experimental animals was required.

As a direct result of the trial, Cobbe circulated a petition designed to stimulate the introduction of legislation. Within six weeks this had attracted 600 signatures, including those of Carlyle, Tennyson, Browning, Sir William Fergusson (Surgeon to the Queen), Dr. Thomson (Archbishop of York), John Ruskin, Lord Coleridge, several Bishops, Members of Parliament and Peers. The petition was formally presented to the RSPCA on 25th January 1875, but it soon became clear that the Society would commit itself to no more than a moderate, fact-finding approach. It fell to Cobbe and her allies to draw up a bill themselves. Much support was lent by Dr. George Hoggan, who described his experiences as an assistant in Bernard's laboratory in a letter to the *Morning Post*. This letter so roused public opinion that Cobbe no longer needed the backing of the RSPCA to gain access to Parliament. A Bill for Regulating the Practice of Vivisection was drafted by Cobbe's group and presented in the House of Lords by Lord Henniker (Lord Hartismore) on 4th May 1875. The Bill sought to regulate the practice of vivisection by providing that it took place only on premises registered and inspected by the Home Office.

Meanwhile a scientific interest group had already begun to discuss how such legislation could be amended or forestalled. This group, spearheaded by Charles Darwin and Thomas Huxley, drew up its own animal protection bill and presented it to the Commons on 12th May of that same year (1875). This bill sought to regulate painful experiments and to protect scientists, first by entirely removing painless experiments from legislative control and second by granting licenses under the

authority of which painful experiments could legally be carried out.

The similarities of the two bills were more significant than their differences. Both bills made provision for the carrying out of painful experiments under appropriate conditions. The RSPCA supported neither bill. It remained firm on its stand of opposition to all painful experiments, though it was at the same time formulating its own proposals for legislation.

These two competing and controversial bills, set against a background of public agitation, persuaded the Home Secretary to allow a public debate on the issue. As a result both bills were withdrawn pending a Royal Commission on Vivisection.

The Commission sat for six months, during which time it received much persuasive evidence from the scientists' lobby regarding the necessity and justification of the experimental method of research. Had it not been for the testimony of an Austrian physiologist, Emmanuel Klein, it is doubtful whether the Commission would have recommended legislation at all. Klein, who had been teaching and conducting research in London for some years, stated categorically that he employed anaesthetics in his work purely for his own convenience. The feelings of his experimental subjects were of no consequence whatever to him. Klein's testimony was instrumental in persuading the Commission that legislation was indeed necessary "to reconcile the needs of science with the just claims of humanity."

While the Commission sat, the first Antivivisection Society was formed by Cobbe and Hoggan in London. It was not an abolitionist society, but aimed only to protect laboratory animals by regulation. It made representations to the Home Secretary regarding the safeguards it wished to see put forward in a Government bill. These were incorporated into the bill which was structured along the lines of a draft bill presented to the Royal Commission by the RSPCA. The Cruelty to Animals bill made remarkably swift progress through both Houses of Parliament, which might have been due to some extent to the constant pressure exerted by Queen Victoria (who felt legislation was essential) upon Disraeli. The bill proposed strict restrictions on all experiments calculated to cause pain. Such experiments would be permitted only if they were performed "with a view to the advancement of knowledge which would be useful for saving human life or alleviating human suffering." All experiments were to be conducted under license and on registered premises. No experiments whatever were permitted upon dogs, cats or equines; and experiments in which animals were allowed to recover from anaesthesia required a special certificate signed by a person of scientific eminence. The bill was considerably stricter than the recommendations in the Report of the Royal Commission in that it provided complete protection for certain species and made a distinction between pure research and research with medical objectives, which the Commission had found itself unable to do.

The reformists were mostly satisfied and felt at this stage that they had all but won the day. The bill had almost reached its final stages. However, at this crucial time Lord Carnarvon, in whose hands the bill lay, was called away from London by the illness and subsequent death of his mother. This event held up proceedings and afforded an opportunity for opponents of the bill to act.

At the instigation of a small core of experimental physiologists and other scientists, almost the entire medical profession was mobilized. The result was a Memorial forwarded by the General Medical Council to the Government setting out objections to the bill. The most important of these was the insistence that legislation should not be restricted to that carried out purely for medical purposes. Crucial

pressure was also exerted on doctors through editorials in the *British Medical Journal*, resulting in a massive deputation to the Home Secretary of several hundred medical doctors and researchers who, on 10th July, presented a petition signed by some 3,000 members of the profession. The British Medical Association had demonstrated its strength. Influential though they were, neither the RSPCA nor the Victoria Street Society could prevent modification of the bill after this.

On 22nd July the scientific contingent met with the Government and outlined the major changes it wished to see in the bill. Amendments were instituted in Committee two days later. These included license to perform acute experiments on any species without certificate, and a requirement for special permission from the Secretary of State before prosecutions could be instituted. The latter provision was adopted and has proved effective in protecting scientists. No successful prosecution for cruelty has ever been brought under the 1876 Act and there have been only 3 prosecutions altogether, the last in 1913.

Feelings among reformists were divided as to whether they ought to acquiesce to the amendments. Cobbe felt that they should not, but was persuaded to do so by Lord Shaftesbury, who saw the bill as better than no legislation at all and a foundation upon which to build. Thus the antivivisectionists mounted no opposition and the amended bill became the Cruelty to Animals Act, 1876. The most important amendment won by the scientists is that the Act placed no real restriction upon legitimate purposes for experiments other than that "the experiment must be performed with a view to the advancement by new discovery of physiological knowledge or of knowledge which will be useful for saving or prolonging life or alleviating suffering."

The Act, far from providing the foundation referred to by Lord Shaftesbury, has never been amended since that day. It has kept abreast with changing trends in research only because its administration has continually been updated. In effecting this administration, the Home Office has found itself stretching the literal meaning of the Act far beyond what could ever have been envisaged in 1876.

In 1876, physiologists were searching for answers to fundamental questions of life; of bodily functions in health and disease. Today much work covered by the 1876 Act can hardly be described as experimental at all. It includes the development and testing of a wide range of products both medical and otherwise. It is largely this trend, the use of animals in routine commercial testing and the increasing numbers of animals so used, which has disturbed humanitarians in the last decade. It is a great pity that the controversy was not better resolved in 1876. Protagonists of ethical and utilitarian arguments had never come so close to agreement as they did just prior to the First Royal Commission. However, attitudes on both sides hardened during the Commission's sittings and a polarization of attitudes took place which is still evident more than a century later.

Disillusioned with the Act during the first few years of its operation, most of the humanitarians who had campaigned for control now became abolitionists, convinced that animal experimentation could not be regulated by law. Thus the animal welfare movement was deeply and permanently fragmented. The scientific community, however, consistently maintained that the law worked well and successive governments have been happy to leave the matter there. Only two public enquiries into the subject have been conducted in Britain since 1876. The 1906 Royal Commission sat for six years and heard a great mass of conflicting evidence. It concluded that the Act had worked well on the whole and instigated some administrative

changes, the main one being the setting up of a special Home Office Advisory Committee on Animal Experimentation.

In response to public pressure, a Departmental Enquiry was set up in 1965 under the Chairmanship of Sir Sydney Littlewood. This Committee made 83 recommendations for change to the 1876 Act, some of which required legislation. Apart from addition of lay members to the Advisory Committee, a strengthening of the Inspectorate and a number of minor administrative changes, the Littlewood recommendations were not implemented. Also, there has never been a full debate of the Report in Parliament, despite constant pressure maintained by humanitarian MP's throughout the late '60s and early '70s. The failure of the government of the day to take action on Littlewood led to a spate of Private Members Bills at this time, none of which progressed through all parliamentary stages.

In the meantime public debate over the issue of experimentation grew more intense in the 1970s, and in the '80s the possibility of Parliamentary action has become that much greater.

## Sewer Science & Pound Seizure

Kenneth P. Stoller

Significant decisions are being made in the City and County of Los Angeles over a seemingly insignificant issue — pound seizure. Outwardly, the issue is a trifle — potentially inconvenienced animal research professionals vs. irate citizens who don't want lost pets sold for research. However, on another level, this conflict has implications that reach to the very depths of irrationality — for far from fighting to promote the practice of pound seizure, scientists should be fighting to end it.

Sec. 53.11(h), L.A.M.C., came into being as the result of a special municipal election in 1950. The ordinance permits "reputable institutions of learning, hospitals, research laboratories or their allied institutes" in the City to "use humanely, unclaimed impounded animals for the good of mankind and the increase of knowledge relating to the cause, prevention, control and cure of disease." Such institutions must be certified by "the Health Officer" when "he is satisfied (that the institutions) will use animals humanely for purposes above specified." This ordinance was passed by the voters of Los Angeles after proponents of pound seizure cajoled voters by using a media campaign which blatantly implied that if one did not vote for the pound seizure ordinance one would be voting away one's own life.

On October 18, 1980, the Animals in Research Advisory Committee of the Los Angeles Department of Animal Regulation submitted a report to the Department. The report represented a year's study by the Advisory Committee of the use of animals in research, testing and teaching in the City of Los Angeles. Some of the observations contained in this report were: 1) failure of some facilities to comply

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with federal law regarding housing standards; 2) destruction of animals at one facility by injections of potassium chloride; 3) duplication of painful and otherwise distressing experiments; 4) increased stress and suffering in "former pets" placed in the laboratory environment; 5) certification of institutions (i.e., that they will use animals humanely) based on the Federal Animal Welfare Act, which only addresses itself to minimum standards for housing and maintenance and not to actual use; 6) transference of animals sold to certified facilities to "affiliate" institutions outside the City which had not been certified; 7) no requirement for investigators to demonstrate knowledge of the physiological or psychological makeup of the animals on which they experiment; and 8) an elitist, defensive posture on the part of much of the research community.

Based on these observations the Committee made the following recommendations regarding all live vertebrate creatures used for research in the City (These are abridged.):

- 1) All animals in research shall be humanely treated, i.e., with the kindness and compassion that exemplifies the best qualities of humankind in its treatment of sentient creatures.
- 2) All animals shall receive proper sanitation, protection from extremes of weather and temperatures and space for normal exercise, as well as adequate veterinary care.
- 3) All animals shall be separated by species when such separation is necessary for humane reasons.
- 4) No animal shall be subject to the immediate physical sensation of pain, or to debilitation or psychological and behavioral distress without being adequately anesthetized, and if pain or lack of normal functioning will result after the anesthesia has worn off, which cannot be controlled by analgesics during a normal recovery period, animals shall be humanely destroyed with the most accepted means of euthanasia available.
- 5) No animal shall be used for more than one unrelated operative procedure or for related operative procedures of the same type not united by a common hypothesis.
- 6) No animal which is used for practice surgery shall be allowed to recover from the anesthetic and must be euthanized at the conclusion of the surgery.
- 7) A veterinarian must be in attendance during any surgical procedure performed on any animal.
- 8) No animal will be used in medical, commercial or educational research if an alternative exists.
- 9) The use of the LD-50 and Draize tests for cosmetics shall be prohibited.
- 10) Each facility shall appoint an animal care committee consisting of five persons, one of whom shall be a veterinarian and one of whom shall be a representative of an animal welfare organization, with the power to disapprove any experiment based upon pain, debilitation or psychological suffering to which an animal is subject, order euthanasia when needed, and refuse animal models to investigators who do not evidence sufficient knowledge of the animal in question. It shall also keep records on all experiments done and their results.
- 11) A central overview committee shall be established to supervise the functioning of the animal care committees and to receive reports from them.
- 12) The General Manager of the Department of Animal Regulation shall appoint a staff veterinarian to serve as liaison between the Department and its overview committee and the research facilities and their animal care committees.

13) Licensed animal dealers must submit to the City a list of animals acquired, the names and addresses of the persons from whom they were acquired, and the dates of acquisition.

14) The City of Los Angeles should take immediate steps to rescind Sec. 53.11(h), L.A.M.C., on the grounds that the ordinance has been proved unenforceable, and institute instead a prohibition against the surrender of impounded animals for research, testing or teaching, or laboratory work of any kind.

On November 18, 1980, the Animal Regulation Commissioners of Los Angeles voted 4 to 1 in favor of rescinding the pound seizure ordinance (the lone dissenting vote came from the only veterinarian Commissioner, who stated that if he had been in a concentration camp in World War II and that if he had the option of going to the gas chamber or being subjected to medical research, he would have chosen medical research).

The General Manager of the City's Department of Animal Regulation sent a comprehensive memorandum to the Mayor on January 2, 1981, requesting repeal of the seizure ordinance. The memorandum concluded that such action "...is necessary if we are to restore full public confidence in the Department of Animal Regulation and to facilitate the return of lost pets to the rightful owners."

The Los Angeles proponents of pound seizure have been led by a lobbying organization called the "Medical Research Association of California." This association claims to have every local hospital, research establishment and medical school represented on its Board of Directors. It is also the parent of a number of committees, such as the Committee for the Ethical Use of Animals in Research. As in the 1950's, a media campaign was begun by medical research interests and no less than Charlton Heston could be heard telling radio listeners that a serious life or death issue would be at hand if the practice of pound seizure were to come to an end. The radio-spots contained such blatant inaccuracies that parts had to be censored by the station which was paid to play them. The idea that the end of pound seizure would significantly curtail medical science was desperately conveyed at all public hearings; in addition, at least one person with an incurable, debilitating illness could be found at any given hearing in order to drive home the point. The fundamental question which must be asked is what could motivate such an effort on behalf of pound seizure?

The use of city pound animals for research has been frowned upon for years. In 1968, Dean Pritchard of the School of Veterinary Medicine at U.C. Davis said, "...the biologist can ill afford to treat animal experimentation in the same naive manner as is currently the fashion. It is all too common to find multi-million dollar research projects, consuming the time of highly talented scientists, based upon studies on animals from city pounds, with little thought given to their suitability for the research being conducted..." (*Lab An Care* 18:230, 1968). In 1973, Dr. Thomas Bowery, then Director of the National Institutes of Health, stated in Congressional testimony that the house pet is "not a good or desirable research animal." What then is the reason for so many people feeling that it is necessary to use lost or abandoned pets for research?

One of the common justifications for the use of dogs is that they have proved very useful in the development of cardiovascular surgery and organ transplantation; however, it has been argued that the dog is a poor model for cardiovascular research. In fact, differences in the clotting rate of dog and human blood held back



application of open heart surgery to human beings by several years.

Perhaps pound seizure is an economic issue. The purchase price of pound animals is small compared to the cost of a conditioned animal obtained from a dealer or to the cost of a purpose-bred animal. The apparent economy of using pound animals in research is just that, apparent. In 1977, Bristol Laboratories (New York) reported that 59% of the 558 dogs and 75% of the 163 cats requisitioned from pounds proved unsuitable for research. Another study (*Lab An Care* 19:506, 1969), produced the following data: In an experiment involving open heart surgery to replace heart valves, 79 out of 85 purebred labrador retrievers survived whereas only 55 of 75 conditioned mongrels survived. If one were to extrapolate this to 100 animals surviving the experiment, one would have to start with 108 purebreds or 137 mongrels. The extra cost involved in performing surgery on 137 mongrels as opposed to 108 purebreds would have been the equivalent (in 1969) of the cost of sixty purebred dogs, and this does not even include the surgeon's and technician's time, nor institutional overhead.

It has also been argued that the number of pound (random-source) animals required by research is very small compared with the number of animals that are euthanized annually. Dr. Andrew Rowan (Institute for the Study of Animal Problems, Washington, DC) testifying at the Los Angeles City Council May 27, 1981, made it clear that a very similar argument could be made for the millions of sewer rats that are exterminated every year. Instead of poisoning them wastefully, they could be trapped and used in research laboratories, but research scientists would not welcome this idea because sewer rats (random-source rats) are not standardized or characterized and are carriers of all sorts of diseases.

The *Los Angeles Times* accused City Council members of sentimentality when a Council subcommittee unanimously voted to rescind the pound seizure ordinance. Dr. Rowan, responding to this statement, told the City Council that if our decisions are made without sentiment and compassion we have no right to call ourselves human beings.

The deeper implications of this issue are revealed in the myopic irrationality which motivates the advocates of pound seizure, for this sort of irresponsible behavior also perpetuates a number of negative practices which can have global consequences. Nature's love is unconditional, but her secrets are given only to those who have earned her trust, yet look how we have abused that trust in the application of our knowledge of the atom. Therefore, as we go about trying to learn Nature's secrets, whether in medicine or in physics, it might behoove us to remember the words of Albert Schweitzer when he spoke of the progress mankind could be making if we had only a little more respect for life. He also said that it is the duty of those (that use animals for research) to ponder in every separate case whether it is really and truly necessary thus to sacrifice an animal for humanity.

On June 30, 1981, the Los Angeles City Council voted 10-3 in favor of rescinding the pound seizure ordinance, but added a codicil regretting that purpose-bred animals would now be doomed to the fate that pound animals had been spared.

# Abnormal Behavior as an Indication of Immaterial Suffering

Hans Hinrich Sambraus

I do not believe that I am the only one who has occasionally been satisfied to take three steps forward and two steps back. Despite the setback, "progress" of one step has been made. At present, the task of animal welfare seems to me to be the preservation of that small bit of progress. In the animal welfare laws of various countries that have come into force in the last few years, terms like "appropriate conditions" and "species-specific activity requirements" have appeared. (These are the three steps forward.) Only the ethologist can determine what they mean in specific cases. But many ethologists who have never concerned themselves with animal welfare problems also feel called upon to voice their opinions. Because the necessary competence is lacking, the resulting judgments are often very curious. Recently a prominent ethologist felt obliged to contribute seven theses to the animal welfare problem. Only a few excerpts will be quoted here (They constitute the two steps back.):

"The animal welfare law that insures the safety and well-being of animals does not protect the animal's legitimate interests, which we cannot even identify..."

"The goal of animal welfare laws is not the well-being of all animals, but rather the education of man with respect to humanity... Cruelty to animals is forbidden only so that we will not become inured to it and be cruel to other people."

Is it really true that we cannot say anything about the pain and suffering of animals? And if we do say something about it, is it only speculation, or in any case not objectively measurable?

I believe that much more than this can be said about the problem. Pain and suffering are feelings, and feelings as such cannot be ascertained by scientific/theoretical means. This is not only true for our judgments concerning the feelings of animals, but also for our judgments concerning the feelings of other people. One could argue that man has language, and hence sufficient possibility to communicate. But we can also simulate pain and suffering or avoid talking about that pain and suffering which we feel. Deceptive behavior therefore leaves room for error in human judgment. But let us also consider preverbal children, the mentally retarded or people whose language we do not understand. In these cases we can recognize pain and suffering from certain symptoms. Some of these in humans include the following: crying; clenched teeth; unusual movements (physical contortions); protection of wounded area; direction of attention to painful spot (looking at, touching); and breaking out in sweat. The same symptoms can also be witnessed in animals in corresponding situations. When a person confirms pain or suffering in another person or in animals, it is done only through reasoning by analogy. We ourselves know how it is to experience pain or to suffer, and also know our corresponding expressions. When we see the same symptoms in animals or other people, we can conclude that they are feeling approximately the same things that are familiar to us from our own experiences.

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Many scientists question the legitimacy of analogous reasoning with respect to animals. The argument is founded on the attitude that humans and animals are basically different. But this is surely an outdated concept. There is constant confirmation and widespread agreement in the fields of morphology, histology and physiology that the differences between humans and "higher" vertebrate animals are slight. The same holds true for behavioral patterns. The pharmaceutical industry tests drugs intended for use on humans (including psychopharmacologicals) on animals first. In the field of psychology one has arrived at much basic knowledge about the human psyche through research on animals. These procedures are only permissible and meaningful if analogies exist.

I do not want to exclude the possibility that one occasionally arrives at false interpretations when making judgments about pain and suffering in animals. But where in the field of biology does one completely avoid error? Scientists attempt to proceed as carefully as possible in their experiments, finally dealing with their findings statistically. It is possible that the results arrived at are significant, in which case one acts as though the facts had been definitely explained. But this is seldom the case. A certain probability of error is always present. Why should we apply more stringent standards to questions concerning an animal's reaction to fear, suffering or lack of well-being?

To this point I have spoken of pain and suffering. It is not generally doubted that animals can experience pain although no one can objectively prove it. The case in which symptoms of pain are registered while corresponding feelings of pain are denied is certainly an exception. If an animal had just broken its leg, only a very few people would fail to notice more than the fact that it cries, tends its leg and tries to run away. Later one would ascertain a dull look, loss of appetite and lack of bodily care. Every well-meaning person would conclude from these symptoms that the animal is in pain and see to it that it is cared for so that the pain will pass. In this respect the evaluation of "technopathies" is relatively simple. These are considered to be diseases or disorders which are the result of poor husbandry. One could therefore pass legal guidelines as quickly as possible permitting only those systems of animal husbandry which cause the slightest amount of technopathies.

But there is also suffering that is not morphologically or physiologically ascertainable. This "immaterial" suffering is considered only fleetingly, if at all, in questions of animal welfare. It is true, for instance, that German and Swiss animal welfare laws call for species-specific diet and care as well as appropriate shelter, and state that the activity requirements (*Bewegungsbedürfnisse*) may not be limited so as to cause suffering. These laws show a basic recognition of immaterial suffering as suffering which arises from an animal's inability to do something in its natural behavioral repertoire. The difficulty is that there is nothing obviously clinically identifiable about this kind of suffering—and only this kind of measure seems to count. Lorenz also regretted this insufficiency: "The heresy exists in the opinion that the real has existence only as that which can be expressed in exact, scientific terminology and mathematically quantified. In so doing one explains away the emotional as unreal illusion." It in no way suffices that scientists committed to animal welfare are convinced that immaterial suffering exists. The ethological signs of immaterial suffering must be made clear for others as well if animal welfare is to continue its progress.

Reactive abnormal behavior is the convincing proof of immaterial suffering for the ethologist. We consider abnormal that behavior which does not correspond to,

or is without object, which appears with sharply increased or decreased frequency, or which is abnormal in its motor pattern. Moreover, much reactive abnormal behavior manifests itself in stereotypies, *i.e.*, the movement is repeated continuously in the same way. Among wild animals and in traditional forms of animal production abnormal behavior is unknown. However, it is encountered often in animals in intensive husbandry systems, and it can be demonstrated that abnormal behavior is actually brought about by conditions of husbandry. It first appears when animals are transferred from good to poor conditions of husbandry. When the conditions are improved the abnormality declines. Often, however, it remains to some extent for a prolonged period even after conditions have been improved. Abnormal behavior is then characterized as residual-reactive. The obstinacy with which the abnormality remains is a further indication that the animal is highly neurotic.

Abnormal behavior appears frequently in two areas: feeding and locomotion. Search for fodder, fodder intake, mastication and swallowing of food all belong to feeding behavior. Abnormality can appear in each of these stages, be it empty chewing or bar-biting in sows (Fig. 1), cannibalism in fattening pigs, tongue rolling in cattle, sucking wind in horses or feather pecking in poultry. All these behaviors show that the animal is frustrated. Similar to the above are "weaving" and mouth movements which appear in numerous species. These are stereotypies of locomotion in animals that want to move forward but are prevented by confinement from doing so.



**Figure 1**  
Sow biting the bar  
of her box stall.

Some abnormal behavior is prevented through force. Tongue-rolling cattle receive a ring in the frenulum under the tongue which causes pain, resulting in reduction of the abnormal activity. The muscles of the pharynx are severed in horses to prevent them from sucking wind. Intervention of this sort is unsatisfactory from the ethologist's point of view. It eliminates the symptom only; the cause of the ailment remains. The animal has the right to an alteration in the conditions that provoke abnormal behavior. In some cases a prevented abnormality is replaced by another. The conditions of husbandry for fattening pigs are generally so poor that cannibalism is almost unavoidable. That is why the piglet's tail is docked. Economic losses are thus prevented, but not the active animal's tendency to bite. A frequent result is that the pigs begin biting the joints, ears or vaginas of animals in neighboring stalls. In some cases the tendency to bite and root up leads to anal massage of other pigs (Fig. 2). This results in a bloody, inflamed anus of the affected pig, which loses its appetite and does not grow in the desired manner. Economic losses still occur although abnormal behavior, namely tail biting, has been prevented. It is a mistake to believe that only the animal whose tail is bitten suffers; the active animal also suffers.

As early as 1968 M. Fox wrote a book entitled *Abnormal Behavior in Animals*. In spite of this valuable and highly respected work we still know very little of the relevance of abnormal behavior to animal welfare. Animal welfare means helping suffering animals. But we can only help them if we know exactly when they are suffering. Abnormal behavior is a key to recognizing suffering in animals. We still have a long way to go before we can more closely describe and understand the significance of all abnormal behavior. We have still a longer way to go to convince producers and legislators that conditions of animal husbandry leading to immaterial suffering too must be changed.



Figure 2 Anal massage of a fattening pig kept under poor housing conditions.

# Where to Put Your Choker

Dr. Roger A. Mugford

The choke chain has come to be regarded as an indispensable aid to training dogs, but even the most time-hallowed practices deserve an occasional critical review. The author has recently completed an investigation into the uses and abuses of choke chains, and failed to find any benefit from using a choker rather than a conventional leather collar. Indeed, there are some very considerable dangers and disadvantages associated with the device. These charges may sound like heresy to many dog-trainers, but to others, it may strike a sympathetic chord.

## *Canine Body Language*

In nature, the wolf does not adorn itself with a collar, so we must presume that the body postures and sensitivities of the dog have evolved without collars in mind. Wolves and dogs communicate by the position and hair cover on the body and tail, by facial expressions and chemical signals. They are not particularly vocal; thus their response to complex voice commands from human beings does not come easily or naturally. One can conclude therefore, that the traditions of spoken commands and tugs at the neck of a dog do not exploit the natural response tendencies of the species.

## *Leash Pulling*

There are some very good reasons why a dog should not be allowed to walk in front of its owner: it is an expression of leadership or dominance over the owner, the dog is exposed to potential danger and the owner could get very tired arms. In practice, very many owners fail to train their dog not to pull on the leash, despite making conscientious efforts to do so. Why should this be so? Perhaps it is because the objectives of training have been wrongly stated or are misunderstood by the dog owners.

In idealistic terms, the behavioral objective of leash-training is to teach the dog that proximity to the body or the legs of the owner is rewarding and being out in front of the owner is unrewarding. The objective should most certainly not be for the dog to learn an association between a vocal command 'HEEL' and a painful sensation to the neck, but of course that is the approach most commonly taken by many dog trainers. There is an important distinction between the two.

In practice, the proximity-training approach to stop leash pulling proceeds as follows:

- a. Use a leash which is sufficiently long for the dog to pass its hindquarters beyond the feet of its owner.
- b. Use a broad collar which physically stops movement of the dog forward, but without causing undue pain.
- c. Command 'HEEL' while braking the dog with its collar and moving alongside and in front of the dog.
- d. Reward it with praise, food or other positive reinforcement when the dog has been passed by the owner.

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The initial element of this training sequence is reward for proximity to the owner, and that is much more effective than delivering pain out in front. As is well known, pain disrupts attention and further learning.

### *Choker vs. Collar*

There are two or possibly three components to the stimulus delivered by the choke chain: first, the clicking noise as it tightens, then tactile sensations to the skin and finally constriction of the musculature, blood vessels and other organs in the neck. The full sequence of checking a dog with a choker takes a finite time: perhaps  $\frac{1}{3}$ - $\frac{1}{2}$  second, and it is a compound stimulus of noise and pain, on a sensitive part of the dog's body.

An 'old-fashioned' leather collar delivers a quite different sensation to the dog: There is an instantaneous connection between tightening lead and neck, and loading is spread over a wider surface area of skin. Thus, there should be little pain and local damage to underlying tissue. The leather collar's great advantage over the choker is that it delivers a punctate stimulus to which one can condition the 'HEEL' sequence. Secondary advantages are that it does not toughen or desensitize the skin to tactile stimuli, it does not deliver disruptive pain, and of course the owner can hang a name tag on the dog.

### *Do Chokers Cause Injury to Dogs?*

This is an issue which is currently provoking considerable concern among some veterinarians. The list of injuries caused to dogs by heavy-handed control with choke chains does not make pleasant reading. The following have either been encountered by the author or reported to him by veterinary surgeons:

- a. Neuromuscular disorders resulting from constriction of the cervical region of the spine.
- b. Ruptured trachea.
- c. Bruising to the ear and ear capsule, causing undue touch sensitivity in this region.
- d. Epileptic fits, triggered by constriction of the blood supply to the brain.

These are not isolated cases, and given the pressures generated by giving a check to a choke chain on a heavy dog, such damage is to be expected. Readers are invited to put one high up on their arm and get someone to give it a yank. Better still, try it on the neck, and remember that a dog's neck carries virtually the same organs and delicate tissues as the human neck. Similar design principles to the choker have been exploited for centuries in the animal trapper's snare. Most dog owners find the above comparison distasteful, particularly if they have seen a wild animal strangled in a snare.

### *Do Chokers Work?*

Clients are referred to the author by veterinarians because their dogs exhibit various behavioral disturbances and problems. Before seeking professional advice, the majority of his clients have attended dog-training classes where they were instructed to fit a choker. Yet about 50% of the clients' dogs still pull on the leash, with or without a choker.

So the reality of using a choker often does not match the expectations which dog owners acquire from dog trainers. It is simply not good enough to say that such owners are hopeless or incompetent, or that there are right and wrong ways to use chokers. The best way to capture the interest and enthusiasm of ordinary pet owners in dog training is to devise techniques which are pleasant to operate and which work in practice.

There is no doubt that one can train a dog that is wearing a choke chain; it is simply that they are cruel and unnecessary. And since one design of choker is little better than another (they all choke!) the best place to put your choker is in the waste basket!

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## Animal Welfare Science Essay Competition

**Deadline: December 31, 1981**

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- All enrolled veterinary students in the U.S. (including those who have graduated within six months of the deadline) are eligible to compete.
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- Essays should be between 4,000-5,000 words in length and may be based on literature and analyses, data gathering projects or personal viewpoints. All essays should be thoroughly documented with appropriate citations and references using the JAVMA format.
- The winners will be welcome to submit their essays to the International Journal for the Study of Animal Problems for consideration of publication.
- Copyright of the winning entries will be transferred to the Institute for the Study of Animal Problems as a condition of receiving the award. The author's rights will be reserved.
- Candidates who are in doubt about the suitability of proposed topics are invited to contact Dr. Michael W. Fox for advice. Examples of subjects from which essay topics (either broader or more specific) may be selected include:

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Predator Control	Laboratory Animal Welfare
Farm Animal Husbandry and Welfare	Zoo Animal Behavior Problems
Use of Animals in Teaching	Welfare of Circus Animals
Humaneness and Veterinary Ethics	Rodeo Animals/Race Horses
Ethical and Legal Aspects of Animal "Rights"	"Pet" Welfare and Owner/Breeder Responsibilities

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# The Coyote (*Canis latrans*) in Panama

Eustorgio Méndez<sup>1</sup>, Francisco Delgado<sup>2</sup>  
and Demetrio Miranda<sup>2</sup>

*This report reveals that the coyote, Canis latrans, has recently extended its southern range to Panamá. The skin of one adult female coyote killed by hunters at Los Pirales, a farm near Gualaca in Chiriquí Province, western Panamá, has been deposited in the Gorgas Memorial Laboratory Vertebrate Collection. Other coyotes have been observed in Alanje, Boquete and Boquerón, other localities of the same province. The probable range of the coyote in Panamá is indicated, and the need for an urgent management strategy for this canid in the Republic is also expressed.*

Among the predators that are hunted by man, the coyote, *Canis latrans* (Fig. 1), surpasses the two species of living wolves (*Canis lupus* and *C. rufus*) in its ability to survive.

Intensive and careful investigations, conducted primarily in the United States and Canada during the last two decades, have demonstrated that the coyote preys to a large extent on small and medium size wild vertebrates, particularly rodents. It has been reported also to feed on vegetation, insects, crustaceans and carrion (Gier, 1975). Indeed, only a small proportion of its food may consist of livestock and poultry (Bekoff and Wells, 1980). This fact, added to other significant ecological factors, seems to be contributing to a change of man's attitude toward the extermination of this animal, a situation similar to that of the changing image of the wolf.

Despite the recognition by many people in the northern part of America of the important role that the coyote plays in maintaining the faunal balance in nature, the extermination campaign against this animal has gradually increased in Mexico and other territories of Central America.

Until recently, the distribution of the coyote included a great part of Canada, Alaska and most of the remaining continental United States and the Central American Isthmus (Bekoff, 1977, 1978). Our report confirms the southern extension of this canid's range to western Panamá.

On June 10, 1980, an adult female coyote was killed by the hunters Juan A. Moreno and Luis A. Ortega in Los Pirales, a farm belonging to Gualaca, about 70 kms from the border with Costa Rica, and some 360 kms from Panamá City. The animal apparently was a member of a pack of four individuals that had been involved in the killing of calves on ranches near the collecting site. The corresponding measurements of the specimen, expressed in millimeters, are as follows: total length, 1128; tail, 336; hind foot, 65; ear, 95. There is no record of its weight, and the skull, unfortunately, was not saved. It is interesting to note that the animal was apparently free of ectoparasites; however, a number of specimens of the psoroptid mite, *Otodectes cynotis* Hering, a species typical of canids and felids, were recorded from both of the ear cavities. The preserved skin is now deposited in the collection of the Gorgas Memorial Laboratory in Panamá City.

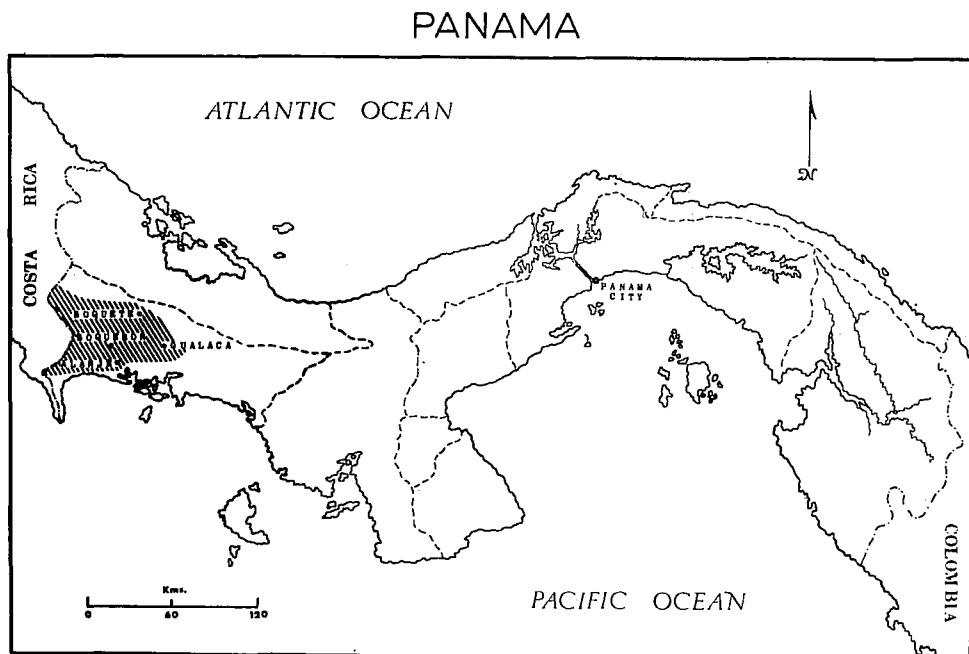
Coyotes have also been seen in the following localities in Panamá: Alanje, Boquete, and Boquerón, all within the Province of Chiriquí. With the exception of

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**Figure 1** The coyote, *Canis latrans*.



**Figure 2** Probable range of the coyote in Panamá, showing localities of Chiriquí Province, where individuals have been observed.

Alanje, classified as Tropical Wet Forest, the other localities are in the Premontane Wet Forest, in accordance with Panamá life zones described by Tosi (1971). Both zones are territories with a high annual precipitation estimated to be over 3000 mm.

According to Jackson (1951) and Hall and Kelson (1959) there are about ten subspecies of *C. latrans* in Central America. The Panamanian coyote seems to represent the race *C. l. dickeyi* Nelson, which is also found in El Salvador, Honduras, Nicaragua and Costa Rica.

In the light of our findings, we have roughly estimated the present range of the coyote in this country as illustrated in Figure 2. The Central Cordillera dividing the western provinces of Chiriquí and Bocas del Toro perhaps will represent a temporary barrier not likely to be readily occupied by coyotes. However, some semi-open second growth forests and agricultural areas, particularly in northern Bocas del Toro, adjacent to Costa Rica, contain more suitable hunting grounds and habitats for the "prairie wolf."

The presence of the coyote in western Panamá, its elusive habits, constant mobility and facility of adaptation to a variety of habitats, indicates the probable further expansion of its range on the Isthmus. If this animal becomes widespread, as it probably will, it would represent the dominant predator in this land. It would compete only to a limited extent with other terrestrial or semi arboreal carnivores. Perhaps its principal competitors would be the gray fox (*Urocyon cinereoargenteus*), the hog-nosed skunk (*Conepatus semistriatus*), the grison (*Galictis allamandi*), the coati (*Nasua nasua*), the raccoons *Procyon lotor* and *P. cancrivorus*, as well as wild cats.

However, with the exception of the jaguarundi (*Felis yagouaroundi*) and the ocelot (*F. pardalis*), which are more common and widespread, the other Panamanian felines, such as the jaguar (*F. onca*), the cougar (*F. concolor*), and the smaller species *F. wiedii* and *F. tigrina* are scarce and do not represent significant competitors. The bush dog (*Speothos venaticus*), another native canid, is a rare species which is apparently represented by few individuals with a distribution restricted to certain virgin forests (Méndez, 1970).

In Panamá the importance of establishing a management program for the coyote, as well as an educational effort for the appreciation of the canid's aesthetic and ecological attributes should be undertaken. The public should know that the coyote is intelligent and social, having an organized family life in addition to taking extended care of its young. This animal is more beneficial than detrimental since it keeps rodents and rabbits under control and does not appear to affect drastically the populations of deer and other ungulates. However, since the coyote occasionally preys on domestic animals, particularly in areas where livestock is raised, it would be impossible to expect that ranchers and farmers would tolerate this predation.

It is important that control of coyotes be done selectively on local sites where the predatory damage really exists. According to the circumstances, a trapping and hunting program should be undertaken by trained biologists of RENARE (Renewable Natural Resources), the Panamanian government agency responsible for wildlife management. Drastic methods such as the use of poisoned baits should be avoided inasmuch as they represent a tremendous hazard not only to other predators, but also to human health.

### Acknowledgements

We are grateful to professors Elva Nelly de Guerra and Crescencio Lezcano, of the Gualaca public school, Chiriquí Province, for donating to the Gorgas Memorial Laboratory Vertebrate Collection the female coyote specimen that was killed at Finca Los Pirales.

Our thanks are also expressed to Mr. Robert Harrington, photographer with the Department of Natural Resources, Michigan, U.S.A., who supplied the coyote photograph used in this paper.

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# One Answer to the Confinement Pig Problem

Arthur Nehring

*A new design for an intensive hog finishing operation is presented. The "maze deconfinement" system consists of a series of 4-walled concrete pens arranged in a T-maze within a confinement building that is designed to utilize solar energy. In addition to low cost and efficient use of energy, the system has the following advantages: higher feed conversion rate; less fighting among and injuries to hogs; some freedom for hogs to exercise and explore; decreased labor. The system has been in use on the author's farm since the end of 1976.*

## *Introduction*

Scientists all over the world have shown that animals cannot be confined without undergoing changes in behavior. Animals become frustrated and aggression builds up with detrimental effects. Zoo curators have already discovered the negative effects of confinement within bare cages and walls. They found that they could not maintain wild animals in a healthy state and capable of reproduction in close confinement. They are now starting to provide environments for their animals which resemble the natural habitats as closely as possible. I believe that hogs, possessing some of the same genetic endowment as wild animals, also cannot tolerate being shut up in cage-like pens.

I have, therefore, developed a new system for finishing hogs which is a modification of present intensive confinement systems. The concept involves a simple adjustment in the layout of the pen walls, but this adjustment creates a radically different environment which can be called 'deconfinement.' The whole idea is to create a more 'natural' living space for the hogs without the frills and expense involved in producing such environments for zoo animals.

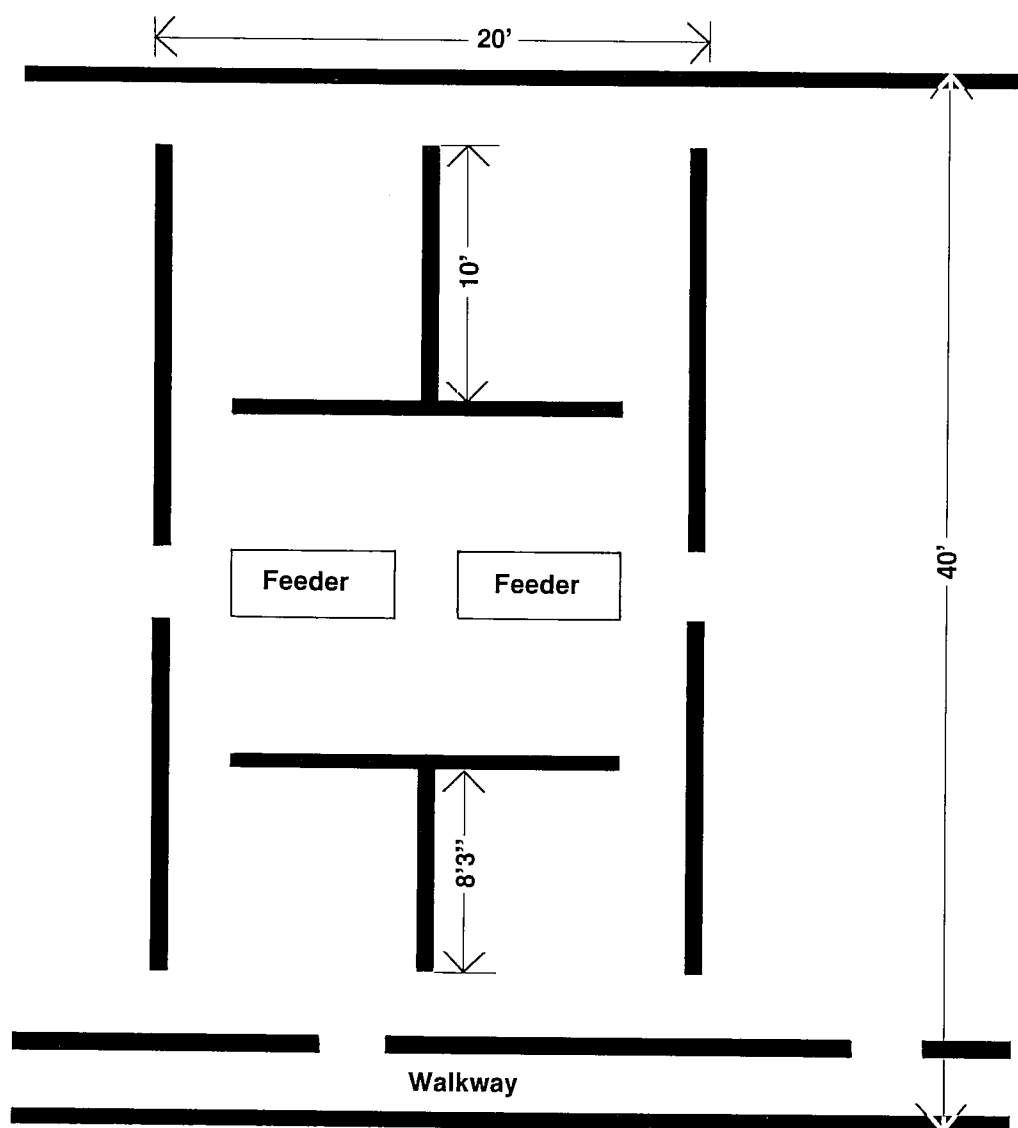
## *The Maze Deconfinement System*

The system I have developed employs a simple maze that requires no more concrete than a unit of plain four-walled pens. (The patent for the design is pending.) Figure 1 shows the basic unit and the dimensions. This design is, in fact, a going hog finishing operation. It was poured into concrete in 1976 and has been in use since December of that year. It has been so successful that we have now built two more like it. The building itself makes maximum use of sunshine in winter and air and shade in summer.

The building is both a passive and active solar collector. The whole south side is one big window of translucent plastic. In addition, all the concrete partitions are tinted coal black, making the entire mass of concrete inside a solar collector. The sun floods the entire inside of the building with sunshine for the whole day. The hogs enjoy basking in the sun and, at the same time, the heated concrete in the building creates a reservoir of heat for the night. Automated louvers controlled by temperature sensors regulate the ventilation and temperature. Heavy insulation with an R factor of 50 is placed in the side walls, and insulation with an R factor of 47 in the ceiling. The south walls are completely automated, insulated and hinged at

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*Mr. Nehring owns and operates a hog finishing farm in Iowa. Address: 107 Michigan, Iowa Falls, IA 50126.*



**Figure 1** Design of one unit of the maze deconfinement system. The openings are set at 2'6" or 2'3".

the top and rise to the ceiling with the rising of the sun and swing down tight against the translucent plastic side of the building when the sun sets.

The building was designed so that the winter sun reaches completely to the back, but the summer sun leaves the whole inside in the shade. Four feet of the entire south side and three and a half feet of the entire north side open up in summer, insuring free air movement through the building. At the same time the particular angle of the slope of the roof and the vent at the top provide free escape of the animals' body heat on hot summer days (Fig. 2). The dimensions of the structure are 330 ft x 40 ft, with the south side being 20 feet high and the north side 7. During the hottest summer days there was no danger of hogs becoming too hot because they had the same kind of shade and air movement as if they were lying under a shade

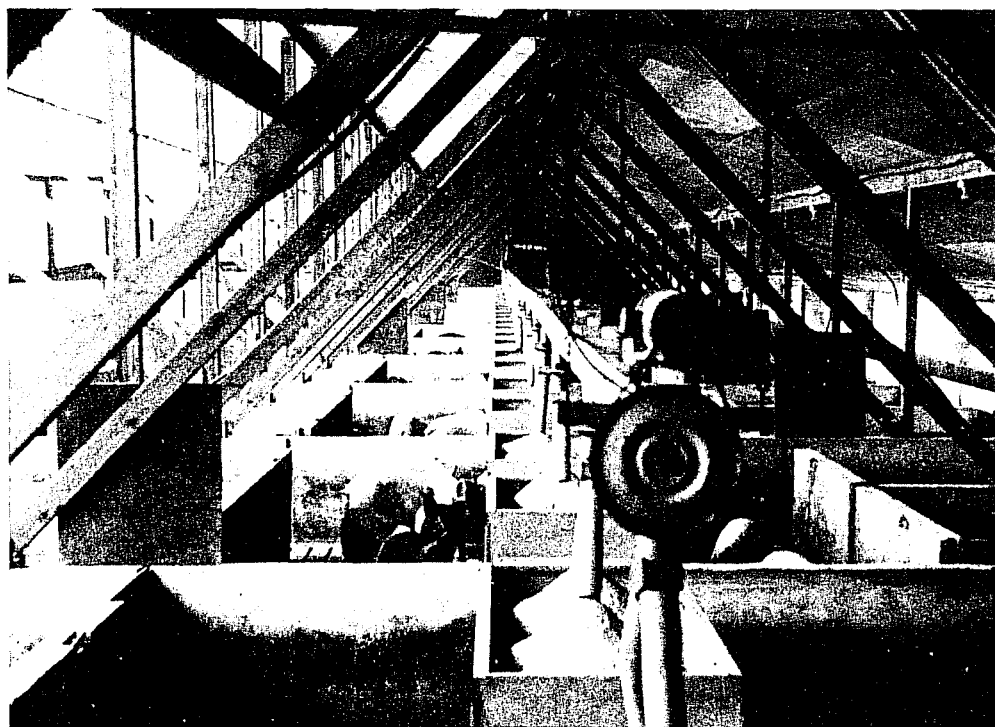


Figure 2 Sloped, ventilated roof for control of body heat.

tree outside. The design of the building makes forced air ventilation superfluous. The automatically controlled vents at the peak of the south wall regulate the air flow according to weather conditions.

### *The Results*

The deconfinement system has been a success in a number of ways. Not only is the feed conversion rate better than in the confinement units, but there is less fighting and fewer injuries. For example, we customarily combine animals from four or more pens, depending on the size of the herd of nursery pigs coming into the finishing unit, but have little or no fighting. When selling, we have experimented by putting pigs from different deconfinement groups together and have not seen any fighting. This cannot be done with confinement pigs.

The deconfinement system has other advantages. It automatically 'house-breaks' the pigs since the particular design has the effect of inspiring the pigs to keep the nooks created by the tees clean. You can walk the length of the building day after day without ever finding a messed up nook. This also means that deconfinement requires a minimum of labor. Automated equipment coupled with no need to scrape makes you feel like a bystander—like it was working for you rather than you working in it.

### *Discussion*

I believe that the deconfinement system works because the pigs do not have the feeling of being shut in: They can run through the openings all day without ever

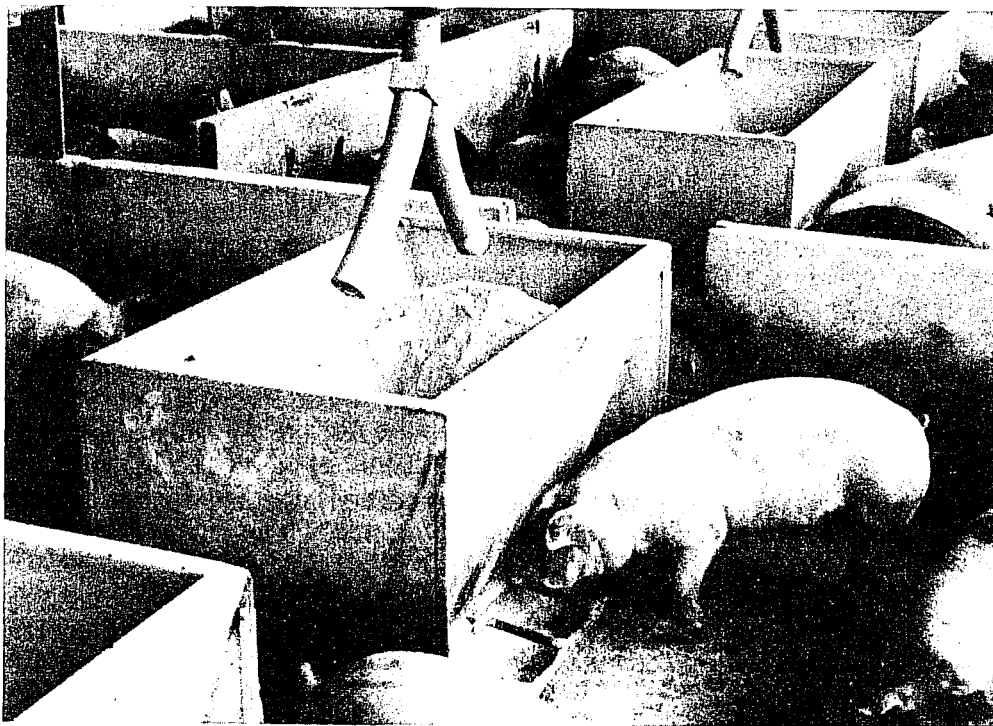
coming to an end of openings to go through (Fig. 3). The maze thus provides the pig with no end to the new horizons to be explored and a whole new life around the very next corner. In confinement, the pigs know in a moment when they are caged and this leads to frustration, aggression and stress.

Another advantage is that the maze allows a pig to escape from the normal level of aggression. When I experimented by opening whole rows of pens containing hundreds of pigs of every size, there was hardly any fighting. I saw one pig chasing another, but the pig being chased ran around the corner. The pig doing the chasing stopped and reacted with evident bewilderment.

I believe this is due to a pig's inability to remember anything which has moved out of its sight.

I also believe that confinement flies in the face of the laws of biological behavior. A confined animal feels trapped and can even be dangerous. Frustration and aggression is a set sequence of animal response to confinement. It is nature's way of arousing an animal to escape from a trap that may threaten its survival. Further, confinement frustrates a pig's exploratory drive and the need to exercise that is as necessary as eating and drinking.

Deconfinement is the solution to confinement problems. The maze system has been built and is performing gratifyingly well. The laws of nature are deferred to rather than defied. Specifically, pigs are given the freedom to run and poke around within the same area as confinement, thus creating an illusion of wide open spaces. At the same time the system uses no complicated trappings. As you can see by the illustration the design is starkly simple and conservative in its use of materials.



**Figure 3** Pigs travelling through maze.



# ISAP SYMPOSIUM

## Wildlife Management in the U.S. Scientific and Humane Issues in Conservation Programs

(Chairman: Dr. Stephen Kellert, Associate Professor,  
School of Forestry and Environmental Studies, Yale University, New Haven, CT.)

**Date:** Wednesday, October 14, 1981

**Time:** 9:00 a.m.-5:00 p.m.

**Place:** Stockholm Room  
Chase-Park Plaza Hotel  
212 N. Kingshighway Blvd.  
St. Louis, MO 63108

**Registration Fee:** \$15

### Topics to be discussed:

*The Controversy over Feral and Exotic Animal Control*

Natasha Atkins, Wildlife Biologist, The Humane Society of the U.S.

*Wildlife Values*

Dr. Daniel J. Witter, Resource Planner, Missouri Dept. of Conservation.

*Bureaucracy and Wildlife*

Dr. Edward Langenau, Jr., Wildlife Research Biologist, Rose Lake Wildlife Research Center, Michigan Dept. of Natural Resources.

*Ethical Issues and Future Directions*

Dr. Michael W. Fox, Director, Institute for the Study of Animal Problems.

*Animal Damage Control: Programs, Consequences, Alternatives*

Guy Hodge, Director, Research and Data, The Humane Society of the U.S.

*Urban Wildlife*

(Speaker to be announced.)

*Panel Discussion: Humane Ethics in Management Programs*

Dr. Allen Brohn, Director, Missouri Dept. of Conservation;

John A. Hoyt, President, The Humane Society of the U.S.;

Jeff Miller, Executive Director, Animal Aid, St. Louis, MO; and

other speakers to be announced.

**HSUS Conference:** The annual conference of The Humane Society of the U.S., this year focusing on *Animal Welfare: The Present Crisis*, will be held in conjunction with the ISAP Symposium on Wednesday through Saturday, October 14-17, 1981 at the Chase-Park Plaza Hotel. A complete program and registration form may be obtained from Ms. Marcia Glaser, HSUS, 2100 L St., N.W., Washington, DC 20037.

**Hotel Reservations:** Rooms have been reserved at special rates for the ISAP Symposium and for the annual conference of The HSUS. Please secure accommodations directly from the hotel by September 11, 1981.

**ISAP Registration:** Prior to October 7, 1981 registration forms with an enclosed check can be mailed to ISAP. There will also be open registration at the symposium from 8:30-9:00 a.m. For further information contact:

Ms. Heather McGiffin

Institute for the Study of Animal Problems

2100 L St., N.W., Washington, DC 20037

(202) 452-1148

# The Buller-Steer Syndrome

Richard Ulbrich

*Bulling among steers is an abnormal behavioral trait and is a common health and economic problem in feedlot operations. Factors associated with the buller-steer syndrome are hormonal implantation, seasonality and environmental conditions, stress, overcrowding, and social interaction between individuals. Research has examined relationships between these and other factors and buller occurrence. Boredom of feedlot cattle may contribute to buller occurrence and other undesirable behavior more than we might suspect. Research is needed to determine the feasibility of enriching the environment of penned livestock in general, the goal of which would be, in theory, the elimination of undesirable behavior as well as increased performance.*

## *Introduction*

The buller-steer syndrome is described as an abnormal behavioral trait where steers and bulls are confined in large numbers. The typical buller-steer sexually attracts his penmates, who take turns following and mounting the abnormal animal. To complicate matters, there appear to be various degrees to bulling activity. Some riding activity is relatively harmless and falls under the category of "horseplay." On the other end of the spectrum we have serious bulling activity in which normal steers vigorously pursue the abnormal steer, the buller, who may or may not be receptive to his tormentors. Escape is occasionally made over and through the feed-bunk or fence.

Many factors have been associated with the buller-steer syndrome: Hormonal implants, seasonality and environmental conditions, overcrowding, stress, pheromones, and social interaction between individuals. Several of these factors have come into play as a result of the prolonged captivity of ancestral species, which is necessary to the process of domestication. In Hafez's text, *The Behaviour of Domestic Animals* (1975), domestication is defined as the removal of an organism from some natural selection pressures over generations. Changes in a species which result from domestication are said to be the consequence of the effects of captivity, and eventually bring about a change in genotype. Hafez (1975) suggests that captivity is a more powerful agent of behavioral change than might be imagined. For example, Russian researchers have described a destabilization of genotype in captivity with a rapid breakdown of the system created by centuries of natural selection in mink and silver foxes (Hafez, 1975).

Captivity removes animals from many natural selection pressures and introduces new stresses. Captivity results in boredom, invasion of personal space and ritualized games. The tendency in natural species of cattle for individuals to space themselves apart must either be modified or express itself in abnormal behavior. This can be illustrated by the distinction found between the behavior of penned livestock and those pasturing or on open range, which more closely resemble "natural" conditions. The latter are relatively free to graze and meander, and to maintain a distance between individuals if desired (R. Ulbrich, personal observation). Farmers and ranchers have long recognized the presence of bullers, but under pasture or range conditions the buller-steer presents no serious difficulty. As feedlots have increased in number and size, so have bullers and the resulting problems (Brower and Kiracofe, 1978).

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## Factors Associated with the Buller-Steer Syndrome

### Social hierarchy

One might suspect the underlying cause of this abnormal behavior to be the social hierarchy, or "pecking order" relationships, which are established among individuals. The submissive behavior of the buller-steer may be the result of the adverse effect of the intensity of social interactions, as suggested by the increased occurrence of bulling activity in pens made up of several groups of newly introduced cattle (Irwin *et al.*, 1979). Brower and Kiracofe (1978) report that not all bullers fit into the classical buller syndrome. Some are the target of aggression and may be at the bottom of the social strata.

In most cases, however, individual social rank among beef cattle does not appear to be the cause of the buller-steer syndrome. Studies reported by Pierson *et al.* (1976) indicate that veterinarians and feedlot employees have observed that bullers may be the biggest, most aggressive steers in the pen or, by contrast, the ones at the bottom of the pecking order.

### Hormonal implants and oral DES

Gassner *et al.* (1958) reported that treatment of feedlot steers with estrogen resulted in undesirable side effects including feminization, high tailheads, and bulling. Further, bulling activity occurred 1 to 3 days after DES implantation and continued for 1 to 2 weeks.

Pierson *et al.* (1976) analyzed the relationship between the occurrence of bulling and hormonal implantation in 4 Colorado feedlots (Table 1). Prior to 1971,

**TABLE 1 — Annual Percentage of Bullers and Anabolic Agent Used 1968-1974**

Year	Total cattle fed	Bullers		Anabolic agent used per animal
		(No.)	(%)	
1968	264,174	3,673	1.39	10mg DES in feed
1969	296,782	3,766	1.27	10mg DES in feed
1970	359,683	6,403	1.78	10mg DES in feed
Total	920,639	13,842		
Mean (%)			(1.50)	
1971	15,546	10,782	2.09	20mg DES in feed
1972	554,361	15,532	2.80	20mg DES in feed and implant
1973	431,761	13,639	3.16	20mg DES in feed and implant
1974	407,450	14,960	3.67	20mg DES in feed and implant
Total	1,90,118	54,913		
Mean (%)			(2.88)	

DES = Diethylstilbestrol.

Taken from "Bulling Among Yearling Feedlot Steers", R.E. Pierson *et al.*, JAVMA 169:521-523.

diethylstilbestrol (DES) was fed at the rate of 10mg per head, and from 1971 to 1974 at the increased rate of 20mg per head. Beginning in 1972, 3 different hormones were used in addition to oral DES. During 1973, the 3 hormones were evaluated by alternately using them on groups of about 400 head until over 160,000 cattle were implanted with 1 of the 3 products. Finally, one of them was selected for its ability to produce efficient weight gains, specifically Synovex-S. During 1974, steers fed for 60 days or less were implanted once. Cattle fed for longer periods were implanted twice. All cattle were given 70mg of antibiotic daily in their feed. Hormone implants and vaccinations for IBR (infectious bovine rhinitis) and leptospirosis were given to all cattle within 10 days of entry at the feedlot.

From 1968 to 1970, when DES was fed as the only anabolic agent, the percentage of bullers fluctuated from 1.27 to 1.78 for the three year period. During this time the daily dosage of DES and hormone implants were used simultaneously.

When the 3 different hormones were compared for feed conversion and weight gains in 1973, there was a difference in the occurrence of bulling. The implant associated with the better weight gains appears to produce the greatest incidence of bulling (Pierson *et al.*, 1976). Nevertheless, it was selected and used exclusively in 1974 (Table 2).

Irwin *et al.* (1979) reported that under certain circumstances, the use of growth-promoting hormonal implants has been found to be related to increased incidence of the buller-steer syndrome. The highest percentage of bullers was found to result from implantation of the progesterone-estradiol product Synovex-S, which also produced the most desirable live weight gains, as was the case in the aforementioned study. Similarly, an increase in the oral dose of DES from 10mg to 20mg was found to result in a slight increase in annual incidence, which increased further when the Synovex implant was used while feeding DES at the higher dosage.

**TABLE 2—Relationship of Bullers to Brand of Implant**

Implant	Dosage (mg)	No. of cattle implanted	Bullers	
			(No.)	(%)
DES*	30	68,086	1,729	2.54
Zearalanol**	36	51,216	1,123	2.19
Progesterone & estradiol†	20	42,020	1,691	4.02

\*Stilpel, Fort Dodge Laboratories, Fort Dodge, IA.

\*\*Ralgro, Commercial Solvents Corporation, Terre Haute, IN.

†Synovex-S, Syntex Laboratories, Inc., Animal Health Division, Des Moines, IA.

Taken from "Bulling Among Yearling Feedlot Steers", R.E. Pierson *et al.*, *JAVMA* 169:512-523.

It should be emphasized that the use of growth promoting hormones, even though they play a significant role in the syndrome, has not been entirely responsible for the occurrence of bulling, as typical buller-steers are observed in feedlots

where implants are not used (Irwin *et al.*, 1979). In any event, it should be noted that administration of DES to beef cattle in the research cited above had taken place before the 1 November 1979 ban on implantation and oral dosing of DES in food animals by the Food and Drug Administration (FDA). Although Synovex-S has been approved by the FDA for use in feedlot cattle with implantation at least 60 days before slaughter (*USDA Agricultural Research* 29(9), May 1981), this factor should play a lesser role in more current analyses of the syndrome.

### Seasonal frequency

Pierson *et al.* (1976) report that seasonal frequency of bulling at 4 Colorado feedlots was constant from 1968 to 1974. Twice as many bullers were seen and removed in the summer and fall than in winter and spring (Table 3). The period of increased bulling coincided with the feeding of green chopped alfalfa. It is suggested that this was due to the coumesterol content in the fresh alfalfa. (Coumesterol is an estrogenic compound which accumulates in alfalfa when fungal pathogens damage the leaves [Pierson *et al.*, 1976].)

Brower and Kiracofe (1978) reported more bullers in July and August than any other months. The type of ration fed was not discussed.

However, the studies of Irwin *et al.* (1979) demonstrated a marked increase in buller frequency during November and December, which may have been associated with the increased number of cattle entering the feedlot at this time.

**TABLE 3—Seasonal Trends for Frequency of Buller Steers 1968-74**

Year	Winter		Spring	
	No. of Feed	Buller %	No. of Feed	Buller %
1968	87,137	.63	87,797	.43
1969	100,753	.59	103,411	.41
1970	110,481	.74	129,713	.58
1971	170,464	1.10	201,340	.94
1972	204,116	1.45	216,556	1.48
1973	195,383	.90	189,180	.90
1974	182,528	1.48	182,068	1.86
Mean %		1.07		1.05

Year	Summer		Fall	
	No. of Feed	Buller %	No. of Feed	Buller %
1968	90,393	1.21	102,802	1.61
1969	102,234	1.07	118,322	1.26
1970	172,077	1.12	196,424	1.48
1971	206,201	1.37	212,524	2.00
1972	223,455	1.85	221,529	2.37
1973	210,467	2.16	213,186	2.64
1974	143,814	3.93	151,391	2.21
Mean %		1.85		1.77

Taken from "Bulling Among Yearling Feedlot Steers", R.E. Pierson *et al.*, *JAVMA* 169:521-523.

### *Weather*

A questionnaire to assess the occurrence, economic impact, and possible causes of the buller-steer syndrome was sent to members of the Kansas Cattle Feeders Council. According to the response, occurrence of bullers was associated with a seasonal or environmental factor such as changing or wet, stormy weather (Brower and Kiracofe, 1978). The number of steers represented was about 20% of the steers on feed in Kansas according to a 1971 United States Department of Agriculture reference (USDA, 1971).

Irwin *et al.* (1979) report findings to the contrary, however. Weather conditions during each day of the week prior to and on the first day of bulling were found to have no relationship to the occurrence of bulling.

### *Entry weight or size*

The entry weight of steers has no effect on buller frequency. The major occurrence was in the same weight range as that for most of the incoming steers (Irwin *et al.*, 1979).

### *Overcrowding*

Three years of records for ten pens of varying sizes involving nearly 11,000 steers were analyzed to determine the effect of overcrowding. Buller frequency was not significantly increased by pen space per head or weight of cattle. For every 10 head increase in total head per pen, the buller incidence increased .015%. For every 9.3 square meters increase in pen size the buller rate decreased .05% (Brower and Kiracofe, 1978).

Irwin *et al.* (1979) found no statistical correlation between buller occurrence and either pen size or square meters per head. Results suggested that as the number of steers per pen increased, irrespective of pen space available, there was a corresponding increase in buller occurrence.

### *Stress*

Stress factors which contribute to buller incidence include changes in environment, routine, and diet, plus handling and transportation of steers to the feedlot. Once cattle are acclimated to feedlot conditions, contributory factors include switching pens, changes in feed routine, and lack of feed (Brower and Kiracofe, 1978).

When the feedman is unable to perform his duties, during a feed mill breakdown, for example, many cattle line up to empty feedbunks in anticipation and are easily excitable. Riding activity is seen to increase and usually persists until the feed situation is corrected (R. Ulbrich, personal observation).

### *Pheromones*

The pathogenesis of the buller-steer syndrome has been considered to involve increased blood concentration of estrogenic hormone, with expression of estrous mounting behavior (Brower and Kiracofe, 1974). Brower and Kiracofe (1972) reported buller-steers to have higher urinary estrogen levels than normal steers. The effeminate behavior of the buller-steer suggests an estrogenic influence, which is supported by the observation of high serum and urinary total estrogens in previous investigations (Brower and Kiracofe, 1974).

Gassner *et al.* (1958) implicated a sex odor as an attractant to penmates by

showing that bulling behavior increased when the buller was injected with estrogen, but decreased with treatment of testosterone. The sexual stimulation of the rider is due indirectly to the olfactory stimulation associated with the release of pheromones by the buller (Irwin *et al.*, 1979). However, the visual stimulus of the buller's stance may be responsible for provoking the mounting behavior, as seen with bulls mounting tethered steers for semen collection (Hafez, 1969).

Serum estradiol and testosterone values were obtained from Synovex-S implanted buller-steers by Irwin *et al.* (1979) at the time of bulling and during a recovery phase. Both gonadal hormones assayed were lower while the steers were bulling than at the end of three days' isolation. The conclusion reached was that the expression of a gonadal hormone may not be responsible for the abnormal behavior.

A pheromone investigation was conducted by Brower and Kiracofe (1978). Urine and feces were collected from overt bullers and normal steers. Buller and nonbuller urine were applied in bags to the tailheads of normal steers. Response of penmates ranged from attempted mountings to no recognition. The latter seemed to be mostly curious about the bags on the steer's rumps. However, more attention was paid to the steers with the buller urine. In all cases experimental steers resisted mounting and engaged in aggressive butting. Buller feces applied to normal steers resulted in minor attention but no attempted mountings.

The results of this experiment would seem to indicate the presence of pheromones. The mechanism by which DES and other growth promoting products result in pheromone secretion is unclear.

### *Economic Impact*

Although the buller-steer syndrome has been known to exist for several years, it has only recently been reported to be of significant monetary importance (Irwin *et al.*, 1979). A 2 to 3% annual incidence is reported in steers fed in Colorado (Pierson *et al.*, 1976) and in Kansas feedlots (Brower and Kiracofe, 1978). Respondents to the Kansas questionnaire estimated that the bullers represented a minimum loss of \$23.00 each. Financial loss involved not only additional labor, facilities, bookkeeping, rations and injury, but also unfavorable public relations. The feedlot operators indicated that buller-steers were enough of a problem to justify spending 5 to 6 dollars per head if a treatment were available (Brower and Kiracofe, 1978).

Pierson *et al.* (1976) report that although riding may continue until the bullers become exhausted, collapse, and die, the main economic loss results from injury of the buller and stress to both buller and rider, and the necessity of early isolation of the victim. However, in the case of a buller fatality, not only does the owner forfeit the animal's cost or worth, someone must stand the loss of the dead animal's accumulative feed—possibly as much as \$200 if nearly finished (R. Ulbrich, personal observation).

Percentage of injuries from bulling coincided with the seasonal occurrence in 4 Colorado feedlots. During 1974, out of almost 2,000 necropsies, it was determined that 83 steers (3.8%) died from riding injuries—18 immediately and 65 after treatment for fractures, contusions, cellulitis, and pneumonia (Pierson *et al.*, 1976). It should be noted that the above figures would not include possible carcass losses upon slaughter of surviving bullers, due to bruises and discoloration, which necessitate trimming of the carcass especially in the loin area, the most valuable carcass component (E. Snyder, feedlot operator, personal communication).

## General Observations

The Kansas survey indicated that the syndrome was not associated with a particular breed, an age or weight class or origin of cattle. Not all bullers fit into the classical buller syndrome. Some are the target of aggression and may be at the bottom of the social strata. In spite of the traumatic experience, the bullers, once segregated, gained as rapidly as their original penmates and were marketed at the same time. Once bullers are removed to a separate pen very little riding occurs, even though the number and density of bullers may be relatively high (Brower and Kiracofe, 1978).

Some steers become bullers because they are debilitated by disease. Once mounting is initiated, it usually continues until the buller is removed (Pierson *et al.*, 1979). The behavior of the buller-steer should not be confused with brief random mounting of individual steers under close confinement (Irwin *et al.*, 1979).

## Prevention

Other than common sense management practices, such as adherence to feeding routines and rations, proper handling, and taking steps to avoid stress, the literature suggests little in the way of prevention.

Simple boredom of feedlot steers may play a larger role in the buller-steer syndrome than we may realize (R. Ulbrich, personal observation). Such a notion would be difficult to prove. Conner is cited (Hafez, 1975) as remarking that no controlled studies of behavior have been conducted to separate genetic and environmental factors of domestication. Animals in their natural state are seen to spend a large portion of their waking hours in the procurement of food. In our ever increasingly intensive livestock systems, we have provided animals with an adequate food supply, without paying much attention to their behavioral needs (Adler, 1976). The barren, monotonous environment of a corral or pen provides an ideal setting for the development of undesirable, sometimes destructive abnormal behavioral traits, as seen with "cribbing" horses and feedlot buller-steers (R. Ulbrich, personal observation). The domestication process has not sufficiently addressed itself to the problem of boredom.

Background music is recommended for all types of livestock in stockyards and slaughter plants to relax animals and cover machinery noise (Grandin, 1980). Perhaps we should apply this type of treatment to the buller-steer problem and thus proceed one step further.

There is a need for the development of a practical manner in which to entertain or at least engage the attention of feedlot cattle and penned livestock in general. In theory, research in this area would have as its goal the elimination of undesirable, abnormal behavior as well as increased performance.

## Conclusions

The buller-steer syndrome is a common health and economic problem in feedlot operations, and appears to be increasing in annual incidence. Intangible monetary losses per buller are estimated at about \$23. If unchecked, bullers perform poorly, if indeed they survive, and the agitation of their penmates undermines the performance of the entire pen. Research has demonstrated the abnormal behavior to be associated with the following: hormonal implants, improper implantation technique, the feeding of fresh alfalfa, stress, and pheromones in some cases. Incidence has been shown to be unrelated to weather conditions, overcrowding,



and weight of cattle. Upon detection, bullers are segregated and treated for injury or illness. In most cases, subsequent riding and injury in "buller pens" is minimal.

To the extent that boredom of feedlot cattle results in abnormal behavior, research should be initiated to explore the feasibility of enriching the environment, possibly by visually engaging the attention, in some manner, of feedlot cattle and penned livestock in general.

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## FORTHCOMING ARTICLES

- Equine Behavior Problems in Relation to Humane Management—Katherine A. Houpt
- Attitudes Toward Animal Suffering—John and Valerie Braithwaite
- Laboratory Animals: Unification of Legislation in Europe—H. Rozmond
- Experiences on the Protection of Large Predators in Finland—Erkki Pulliainen
- Injuries to Birds of Prey Caught in Leghold Traps—Katherine Durham
- Effects of Ethostasis on Farm Animal Behavior—Andrew F. Fraser and Michael W. Fox
- Volume 2 Number 6: Zoo Issue
- The Role and Responsibility of Zoos: An Animal Protection Viewpoint—John E. Cooper
- Zoo Philosophy, Goals and Exhibition Principles—Randall L. Eaton
- People at Zoos: A Sociological Approach—Edward G. Ludwig

# Legislation & Regulation

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## ASZ Cannot Support HR 556

The American Society of Zoologists (Thousand Oaks, CA) has issued a statement on HR 556, the Research Modernization Bill (see 2(2):103, 1981), which is reproduced below:

The American Society of Zoologists supports efforts to improve the lot of laboratory animals. It does so, not only on humanitarian grounds, but also for the practical reason that badly maintained animals do not give reliable results. Nonetheless, while sharing many of its goals, the Society cannot give its support to HR 556, due to a number of practical problems in the Bill. Among them are the following:

1. Scientists have been quick to adopt cheaper substitutes, such as the Ames test, for live animal research. The declining budget for scientific research should accelerate this trend even more. Yet it is misleading to suggest that tests on bacteria or computer simulations can replace 30-50% of all advanced live animal research. In medical research, this assumption is particularly erroneous. A bacterium may be used to screen for genetic mutations, but it cannot tell much about the likelihood of a drug's producing nausea in a human digestive tract. Nor are computer simulations a panacea: a computer model requires an exceedingly thorough understanding of the organism. Developing the model itself requires animal experimentation. Without accurate input, the model would be useless: garbage in, garbage out.

2. At the largest research institutions, new methods are used upon publication, if not before. But in smaller institutions, or in student exercises, assistance would be very useful. The ASZ would like to see short courses, such as those in NSF's Chataqua (sic) program, which would instruct laboratory scientists and classroom teachers in techniques or lab exercises which avoid the

use of live animals. This constructive aid would probably pay off in one or two semesters. Thus, Sec. (a and b) of HR 556 is a step forward, though consolidation within one agency would probably lead to economies of scale. Even so, it is worth emphasizing that up until now, the National Science Foundation has been empowered to carry out programs of this type; only money has been lacking.

3. "Publish or perish" is the rule of scientists. But journals will not publish material unless it is new. Thus, scientists have the strongest possible incentive to avoid duplication: If they don't, the result is less likely to be published. When this rule is violated, the researcher usually has a very good reason. He or she probably thinks the original work was badly done, or left out some important factor. Due to the calculated risk to one's career, duplicate research is never carried out capriciously. Any law forbidding duplication of research (as in Sec. 10(b)) is pointless or counterproductive, since scientists have had such a "law" for years.

4. The bill affects only federally-funded research. At present, this research ranges from studies of the breeding of pandas at the National Zoo to tests of cancer drugs on live animals. It does *not* cover Draize tests of new types of mascara or hair dye, for example. These latter tests are funded by cosmetic companies, and would be unaffected by this bill. Does it make sense to slash federally-funded research, and leave industrially-oriented experiments unscathed?

5. As zoologists who study a broad range of species in the animal kingdom, we are concerned that the definition of "alternative methods of research and testing" includes "the use of... lower organisms." By conservative estimate, there are over a million species of animals on the planet, from corals to koalas. Is an intelligent octopus a higher organism, while a dull lab rat is a lower

one, or vice-versa? Or is the word "animal" intended to be mis-defined, as it sometimes is, as "mammal," so that chimps, rats, bats, and koalas are protected, while chickens, hummingbirds, lizards, frogs, starfish, crabs, beetles, ants and water bears are not? Or are *all* multi-celled animals protected? Our members need to know which of the thousands of species we study will fall within this law.

6. Finally, we object to so vast a reprogramming of the research budget of these agencies. If 30-50% of the budgets for research on live animals of NSF, USDA, NIH, EPA, DOE, DOT, NASA, NRC, FDA, Commerce, and Defense are redirected as this bill requires, the amount of money is over \$1 billion. For NIH especially, the effect would be devastating. Moreover, in many cases, Congress has required these tests for consumer or environmental safety. How will these tests be funded otherwise? Will Congress then have to increase each agency's budget, so that enough money exists among the remaining 50-70% to do all of the required tests? Moreover, a sudden windfall of over \$1 billion seems to be a classic case of throwing money at a problem. Is there really \$1 billion worth of high quality research in alternative methods out there waiting to be done?

If HR 556 is clarified to reflect the existing conditions in research laboratories more accurately, and if the method and amount of funding is changed substantially, the American Society of Zoologists would look forward to working with elected representatives to form a program which will benefit all laboratory animals (*ASZ Newsletter*, April 1981).

### **Transport of Horses for Slaughter**

A bill has been introduced into the Senate by John Melcher (D-MT) which would give the Secretary of Agriculture the authority to set regulations for the treatment of horses being transported for slaughter. Section 203 of the bill (S. 1053) reads: "The Secretary shall pro-

mulgate, by rule within six months after the date of enactment of this title, standards to govern the humane handling, care, treatment, and transportation in commerce of horses intended for slaughter. Such standards shall include minimum requirements with respect to handling, feeding, watering, loading, sanitation, ventilation, and shelter from extremes of weather and temperatures, size and condition of vehicle, position of horses by sex and size, and verification that the horses are fit to travel."

The bill also provides for investigations to be conducted to determine violations in practice. These would include, but not be limited to, inspection of horses and vehicle upon arrival at the slaughter plant by Federal Meat Inspectors, who would be permitted to confiscate and humanely destroy any horse "found to be suffering as a result of failure to comply" with any provision of the bill. Violators would be assessed a civil penalty of no more than \$1,000 per violation, and could receive a maximum jail sentence of one year in lieu of or in addition to the fine.

This bill would cover horses being transported to any of the 20 slaughter plants located in the U.S. The approximately 30,000 horses that are exported to Canada for slaughter per year (*Agriculture Canada*, 1981) would be covered until they reached the Canadian border. As presently required under Canadian law, the horses must be examined by a veterinarian as they cross the border.

## **Current Events**

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### **FORTHCOMING MEETINGS**

**International Conference on the Human/Companion Animal Bond:** October 5-7, 1981, Philadelphia, PA. Sponsored

by the University of Pennsylvania Center for the Interaction of Animals and Society and the Delta Group of the Latham Foundation. Contact the Center (above), School of Veterinary Medicine, University of Pennsylvania, 3800 Spruce St., Philadelphia, PA 19104.

**Society for the Study of Ethics and**

**Animals:** Third Annual Meeting, December 27, 1981 (tentative), Philadelphia, PA. Contact Professor Harlan B. Miller, Dept. of Philosophy and Religion, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

**American Association for the Advancement of Science:** Annual Meeting, January 3-8, 1982, Washington, DC. Contact AAAS Meetings Office, 1776 Massachusetts Ave., NW, Washington, DC 20036.

**Southwest Foundation:** Symposium on "The Use of Nonhuman Primates in Exotic Viral and Immunologic Diseases," February 28-March 3, 1982, San Antonio, Texas. Sessions will include general considerations (husbandry, spontaneous diseases, primate viruses, alternative methodologies, and germ-free and SPF non-human primates), immunology and immunologic alterations (including blood diseases and genetic aspects and viral diseases), comparative medicine (animals other than simians for the study of disease) and biohazards. Attendance will be limited to 250 persons. Abstracts will be required from speakers. All reports will be published. Contact Dr. S.S. Kalter, Southwest Foundation for Research and Education, P.O. Box 28147, San Antonio, TX 78284.

**Humane Research Trust:** The Role of Animals in Scientific Research and their Effectiveness as Substitute Models for Man, April 21-23, 1982, Manchester University, Manchester, UK. Scheduled speakers: Dr. H. Muir, Prof. G. Marsden, Prof. M. Panigel, Mr. R.N. T.-W.-Fiennes, Air Commodore J. Malcolm, Mrs. R. Clayton, Dr. E. Carson, Prof. D. Davies, Prof.

D. Parke, Prof. P. Turner, Dr. J. Fry, Dr. S. Vine, Prof. J. Bridges, Dr. T. Connors, Dr. J. Parry, Dr. M. Dawson. Registration fee is £50, including accommodation and meals. Contact the Conference Organizer, Humane Research Trust, Brook House, 24 Bramhall Lane South, Bramhall, Stockport, Cheshire SK7 2DN, UK.

**2nd European Conference on Farm Animal Welfare:** May 1982, Strasbourg, France. The first part of the Conference will involve a review of progress made in farm animal welfare since the first European Conference, which was held in Amsterdam in 1979. The second and major part will be devoted to the transportation and handling of farm animals production to slaughter. The Secretary General of the Council of Europe has agreed to the Conference being held in the Council's Assembly Chamber and therefore the exact date in May will not be determined until the Council and the European Parliament have settled their own meeting dates for 1982.

**Zoological Society of Philadelphia and the Institute for Cancer Research:** Symposium on Animal Counterparts of Human Disease, With Particular Reference to Hepatitis B-like Viruses, May 16-20, 1982, Franklin Plaza Hotel, Philadelphia, Pennsylvania. Contact Theresa Mullarkey, Philadelphia Zoological Garden, 34th St. and Gerard Ave., Philadelphia, PA 19104.

**International Primatological Society: IXth Congress,** August 8-13, 1982, Atlanta, GA. The annual meeting of the American Society of Primatologists will be held jointly with the Congress. Contact Dr. Frederick A. King, Director, Yerkes Regional Primate Research Center, Emory University, Atlanta, GA 30322.

## ANNOUNCEMENTS

### IRLG Guidelines

The Interagency Regulatory Liaison Group has been working since 1977 to

produce one set of guidelines for toxicity testing which could be applied to the various government agencies responsible for regulating chemical substances affecting health and the environment. The following *Recommended Guidelines* are now in print: *Acute Eye Irritation Testing*; *Acute Dermal Toxicity Test*; *Acute Oral Toxicity Testing in Rodents*; *Teratogenicity Studies in the Rat, Mouse, Hamster or Rabbit*. Copies of the guidelines can be obtained from the U.S. Department of Health and Human Services, Consumer Communications Staff, Office of Consumer Affairs, 5600 Fishers Lane (HFE-88), Rockville, MD 20857.

### **Campaign Against LD50**

On 23 May, at an Animal Aid rally in Birmingham, England, Jean Pink (Animal Aid) and Henry Spira (Coalition to Abolish the Draize Test) announced the formation of an international coalition to campaign for the abolition of the LD50 (lethal dose — 50%) test. This toxicological test is designed to determine the single dosage level of a substance which will kill 50% of the laboratory animals receiving it. Two recently published papers detail some of the scientific and technical shortcomings of the test, which has long been under attack by animal protection organizations (*Pharmaceutical Technology* 5(4):65, 1981; *Archives of Toxicology* 47:77, 1981). Persons interested in the campaign should contact Ms. Pink at Animal Aid, 111 High Street, Tonbridge, Kent, UK, or Mr. Spira at 1 West 85th Street, New York, NY 10024.

### **Vegetarian Times Goes Monthly**

Effective with the September 1981 issue, *Vegetarian Times* will increase its publishing frequency from 10 issues a year to become a monthly publication. The magazine will be on sale the 15th of the month preceding the date of issue. *Vegetarian Times* is the only national consumer magazine geared toward the vegetarian lifestyle. Each issue contains listings of restaurants, recipes, people

profiles, and in-depth articles of interest to vegetarians and health-conscious people. Circulation of the magazine has tripled over the past three years from 20,000 to 60,000. Costs for *Vegetarian Times*: Single copy \$1.95; one-year subscription \$19.95; two-year subscription \$36.00; three-year subscription \$50.00.

### **Program in Applied Animal Behavior**

The Department of Animal Science, in cooperation with other departments at the University of Maryland and the USDA research station at Beltsville, is developing a graduate program in applied animal behavior. Graduate students are being sought who wish to investigate behavior and production relationships among domestic farm animals. Research facilities are available for the investigation of behavior of beef cattle, dairy cattle, swine, horses, poultry, sheep, rabbits, and wildlife. Graduate Teaching Assistants receive \$4,800 per year (10 mos.) and Research Assistants receive \$5,760 per year (12 mos.). Tuition is waived for assistantship recipients. For information and application forms contact: W.R. Stricklin or T.G. Hartsock, Dept. of Animal Science, University of Maryland, College Park, MD 20742.

### **SCAW Conference: Science and Animal Welfare**

The First Conference on Scientific Perspectives in Animal Welfare will be held at the National 4-H Center, 7100 Connecticut Avenue, Chevy Chase, Maryland (in the Washington, D.C. metropolitan area), on November 11-13, 1981. The conference is sponsored by the Scientists' Center for Animal Welfare.

The intent of the meeting is to discuss scientists' responsibilities in animal experimentation. Participants will assess the state of the art, identify areas for special consideration, and make recommendations in the four topic areas of responsibility: investigator, institutional, funding agency and review groups, and editorial.

Invited speakers, who represent a wide range of scientific interests and viewpoints, include: Thomas Malone, Ph.D., Acting Director, National Institutes of Health; Franklin M. Loew, D.V.M., Ph.D., Director, Division of Comparative Medicine, The Johns Hopkins University School of Medicine; Harlyn O. Halvorson, Ph.D., Director, Rosensteil Basic Medical Sciences Research Center, Brandeis University; Marc E. Weksler, M.D., Wright Professor of Medicine; Director, Division of Geriatrics and Gerontology, Cornell University Medical College; Harold Feinberg, Ph.D., Professor, Department of Pharmacology, University of Illinois School of Medicine; Frederick W.L. Kerr, M.D., Professor of Neurosurgery and Neuroanatomy, Mayo Medical School; Carlos E. Eyzaguirre, M.D., Professor and Chairman, Department of Physiology, University of Utah College of Medicine.

The program chairman is W. Jean Dodds, D.V.M., Division of Laboratories and Research, New York State Department of Health, Albany, New York.

Attendance will be limited to scientists. Preregistration is required; the registration fee is \$85.00 before September 15 and \$100.00 thereafter. For registration materials and further information please contact: Ms. Marcia Feinleib, Scientists' Center for Animal Welfare, 11325 Seven Locks Road, Suite 221, Potomac, Maryland 20854, (301) 983-0544.

### **FRAME Plans New Journal**

The Fund for the Replacement of Animals in Medical Experiments (FRAME) is changing the format and title of its bi-annual publication, *ATLA Abstracts*, from a compendium of research abstracts, which report on the development of alternative techniques, to a journal called *ATLA*, which will include original and review research articles, technical news, book reviews and information on meetings of interest. Further details can be obtained from FRAME, 312a Worple Road, London SW20 8QU, UK.

# Book News

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**THE LAYING HEN AND ITS ENVIRONMENT**, R. Moss, ed. (Martinus Nijhoff, The Hague, The Netherlands, 1980, \$42.20). This is a timely publication, considering the growing world-wide interest in the welfare of farm animals. Contributions from an international group of poultry physiologists and ethologists, assembled by the Commission of the European Communities, provide some indices of the normal physiological and behavioral range of the laying hen and also demonstrate intrinsic problems with existing intensive husbandry systems and point up areas for further research and development.

Some scientists in the U.S. have gone so far as to suggest that the greater productivity of various livestock species (compared to production records of 10 and 20 years ago) is a clear indication of improved welfare, ignoring the fact of genetic improvements. One contributor to this publication, G.C. Brantas, pointed out the limitations of using productivity as a basis for determining welfare and adaptation. For example, laying hens may be less productive in one farm or husbandry system compared to another because of a difference in feed, lighting, energy requirements, or genetic lineage and not because their adaptability or welfare is in jeopardy.

In spite of the potentials for genetically modifying poultry, scientists in this symposium generally agreed that environmental modifications, rather than genetic ones, would be more practical and quantifiable for improving welfare and adaptability.

B.O. Hughes' paper on the assessment of behavioral needs provided a good theoretical basis for this symposium. Hughes stated that it is *desirable* to make provisions for certain categories of behavior such as dust bathing and avoidance of aggression, and *essential* for such categories as nesting, sleep-

ing and normal pecking activities that have a strong internal drive which, if frustrated, can lead to abnormal stereotypic, distorted or maladaptive forms of behavior. Hughes stated that caged hens need enough space not only to avoid each other's bodies, but also to be able to orient themselves to avoid aggressive confrontations. Thus, having a central feed-trough running down between two backs of cages in flat-deck batteries will cause aggression and stress, as birds from opposite cages must face each other to feed.

D.W. Fölsch reported comparative studies of hens in battery cages, on wire floor and in deep-litter pens. The highest incidence of mutual disturbance or disruption of behavior and of "dominant" calls occurred in battery-caged birds, while "friendly" calls were recorded most frequently in birds housed in deep litter; those on wire floors were intermediate. (Fölsch's use of subjective terminology to describe these vocalizations evoked some heated responses from other participants.)

K. Vestergaard found that in a study of hens on wire floors, provision of a dust box was correlated with a marked decrease in the amount of aggressive pecking and threats. M. Pripp said that in Denmark, 7-8% of farmers have had problems with hysteria in flocks kept on wire floors; hence their wanting to change to cage systems, but Vestergaard reported that Danish farmers had no such problems if birds were stocked at the rate of 10 per m<sup>2</sup> or less. Similarly, while J.A. Hill judged deep-litter systems to be less productive than battery cages, Fölsch and C.M. Hann found no difference in productivity between these systems provided eggs were collected frequently (to reduce damage), a point also emphasized by K. Vestergaard, i.e., good management was the key to optimal production.

However, regardless of the quality of management, the design of battery cage systems is far from perfected. R. Tauson gave one of the most practical papers of the symposium, demonstrating with objective, quantified data and comparative studies how many cage de-

signs cause unnecessary suffering and adversely affect productivity and profits. This paper especially should be assigned reading for all poultry scientists, farmers and equipment manufacturers.

No consensus was reached as to the optimal space allowances for laying hens although some agreed that approximately 340-400cm<sup>2</sup> floor space and 10cm trough length were probably the minimal allowances per bird, while others suggested 600-700cm<sup>2</sup> per bird in a cage system. In discussion, C.M. Hann presented the idea of enriching the barren environment of battery-caged layers with various stimuli such as hanging toys. J.A. Hill stressed the need for more research on the interactions between the rearing and production stages of the bird's life, in each of which it may be kept under very different conditions. K. Vestergaard proposed that if the symposium participants concluded that "...we cannot accept a stocking density greater than 600 or 650cm<sup>2</sup>/bird, then it will stimulate development of other systems which have many more advantages and a greater potential for improvement." H.C. Adler expressed the concern that research is "...not going to benefit the commercial hen for many years, and she will still be in a cage." Thus, what might the EEC do to ensure better cage construction? R. Tauson briefly described how improvements are made through close collaboration with state veterinarians, producers and cage manufacturers.

The publication contains a general summary of the symposium by W.F. Raymond, in which he agrees that productivity is not a reliable index of adequate welfare and that greater imagination is needed in designing enriched environments that mimic the normal environment. Although R. Moss' definition of well-being as "total clinical health with no frustrative or distorted behavior for a given breed in a given environment" might be a goal toward which to strive, Raymond concluded that it is more important at this stage to prevent disturbed behavior in farm stock than it is to insist on a complete portfolio of normal behavior. Realistically, there is not such

thing as a completely satisfied or disease-free animal; thus, "...research scientists should obtain as much reliable information as possible to allow extension workers, manufacturers and farmers to develop and install systems which allow an acceptable compromise between profitability and the often ill-defined concepts of animal welfare that we have been discussing." Raymond urged greater international cooperation on research which would focus on a small number of large experiments with better replication and range of expertise needed to understand the complex subject of welfare and behavior. — M.W. Fox

**ANIMALS IN RESEARCH: NEW PERSPECTIVES IN ANIMAL EXPERIMENTATION**, David Sperlinger, ed. (J. Wiley and Sons, Chichester, UK/New York, NY, 1981, \$46.50). This is a serious contribution to the current debate on the use of animals in research and industry. The book aims for a balanced presentation, and the editor has chosen authors with a wide range of views on the ethical questions involved. The book is divided into three sections: Part I is an examination of the legal and social context in which animal experimentation takes place. Part II presents reviews of the major areas of animal experimentation, including the use of animals in schools in Britain and the United States. Part III explores practical and theoretical issues raised by the whole area of experiments on live animals.

Sperlinger's own contribution is concerned with issues raised by the obvious inconsistencies of attitudes toward animals in modern society and with the question of whether human beings are in some way unique. He concludes that basically they are not and argues for a switch in attitude from seeing animals as objects to recognizing them as subjects. With this new attitude, it will then be evident that "...much of our current use of animals, including much animal experimentation, is not of such central importance to human life as to justify these

practices continuing." With a few exceptions I think this view would be shared by most of the authors involved. Indeed, some (such as D. Bannister, who contributes a radical dismissal of animal psychology, and D. Paterson, who argues for effectively eliminating experimental work [even dissection] from schools) are strongly opposed to the use of animals in research or teaching, at least in the fields they have been asked to write about.

There might, therefore, be an understandable inclination amongst medical scientists to dismiss this book as yet another manifestation of the current trend to criticize animal research. I think that would be a mistake on several grounds. First, by and large the criticism is well-presented and is, with a few exceptions, not unreasonable. Second, the problem is not going to disappear simply by ignoring it; this book itself is strong evidence for that and for the fact that the criticism is becoming more articulate and better informed. Third, there are some very valuable contributions in the book, such as the introductory chapters summarizing the law on animal experiments in different countries and some of the chapters on specific uses of animals. I particularly enjoyed L. Goldman's chapter on the medical sciences in general, H.B. Hewitt's chapter on cancer research and D. MacDonald and M. Dawkins on ethology. I would also mention here a thoughtful chapter by M. Midgley on "Why Knowledge Matters" in the final section of the book. By singling out these authors I do not mean to imply that I agree with all (or even most) of what they say—I simply mean that they are well worth reading.

#### *Reduction across the board?*

It is difficult, of course, to produce a general response to a book written by so many different authors. I do, however, find myself reacting to two issues in particular. First, there is a general assumption that it would be a good idea to *reduce* the number of animal experiments. That is no doubt correct from many points of view, but it is not at all clear to me that this is always a desirable aim. For example, mammalian physi-



ology in Britain is now seriously handicapped by the high costs of specially-bred animals and the reduced real value of university research grants. Yet this subject, which has a tradition of success in the U.K., and which has been of fundamental importance in providing the base for much medical progress, uses only a very small number of cats and dogs compared to the enormous numbers of domestic animals killed when their owners no longer wish to care for them.

I carry an organ-donor card and hope that my body may be of use medically if I meet a premature death. I see the use of animals that would anyway be killed as raising not dissimilar issues: If death occurs, better it should be beneficial than of no consequence. I should, of course, emphasize here that what I have in mind is research on totally anesthetized animals. The vast majority of mammalian physiology research in the U.K. comes into this category. And just in case I am accused of pressing my own interests, let me say that my own research does not involve experiments under the 1876 Act. I work entirely with *in vitro* and computer methods. But I am worried about the future of other branches of physiology in the U.K.

### *Justification of research*

The second issue on which I should like to comment is that of balancing the benefits of research against the possible costs, including animal use. I entirely agree with the view expressed, explicitly or otherwise, by many of the authors of this book, that not all research is justified. One must be selective, and I would agree that someone (in most proposed legislation this would be an Advisory Committee) must weigh the merits and disadvantages of any potentially painful research. But let us be clear that this will not be an easy task. I can illustrate my point here by reference to the chapter by R. Drewett and W. Kani on "Animal Experimentation in the Behavioural Sciences." In practice, this chapter seeks to make judgments similar to those that would have to be made by an Advisory Committee. Three areas are reviewed in

this way: the control of sexual behavior, pain, and vision. In particular, the work of Hubel, Wiesel, Blakemore, Barlow and others on vision is judged unfavorably on the grounds that any clinical implications arising from the demonstration that there is a critical period in the development of vision were already known.

Now, this is a common form of attack on research: that in retrospect, the results are either obvious or already known. But it is a major feature of good scientific work that it does *not* necessarily accept what has "already been shown." My own suspicion is that the authors have only limited acquaintance with the work involved and with the range of its possible medical significance. (Some of the important effects of unocular deprivation in Blakemore's work were certainly not known before. Indeed, one of the main neurophysiological findings [that such deprivation does not retard the maturation of neuronal acuity in the lateral geniculate nucleus] was both a complete surprise and one which has obvious implications for any attempt to identify the site of pathological change.) Serious judgments of this nature really do require more than 3 pages of analysis, for the authors admit that the experiments leave "little room for doubt as to their scientific value." It is their importance in guiding clinical practice that is questioned. We should remember, however, that in their extensive study of developments in cardiovascular medicine, Comroe and Dripps showed that about 40% of the work considered important for clinical practice was not seen as being so *at the time it was done*.

My point is not to argue that we should not therefore make any judgment about the possible clinical value of research (in fact, research councils do this all the time), but rather that it is important that this not be the only criterion. For if work that leaves "little room for doubt as to its scientific value" is to be judged unfavorably because it has not yet been shown to be clinically useful, we shall eventually cut off the roots from which much clinical advance even-

tually comes. What is needed is recognition that even if one is only interested in future clinical advances, one has to support the fundamental research base to some degree. The problem then is to develop criteria for judging what is worthwhile in terms of increased general scientific knowledge as well as in terms of immediate medical advance. Surely it cannot be beyond the ability of future legislation to make use of the experience of research councils and foundations to produce effective advisory committees. As one of the contributors to this book remarks (Goldman), some academic bodies in the U.K. are already doing the job concerned in their own meetings. He quotes the experience of the Physiological Society, which regularly votes on the acceptability of scientific papers presented at its meetings and where rejection can and does sometimes occur on ethical grounds. My own experience of these meetings leaves me feeling that a layman might be surprised to find that the underlying sentiments that govern the discussion are quite as anthropomorphic as many of the contributors to this book would wish them to be. Contrary to the impression given by this book, I do not find my colleagues who work under the 1876 Act desensitized and incapable of imagining the feelings of animals.

It is worth noting that classical physiological work (for which the 1876 Act was largely designed) does not generally come under severe attack. The areas that do (such as experimental psychology and toxicology) are ones in which animal use has developed more recently and in which general anesthesia is hardly ever employed. Clearly, there are fundamentally different problems here. In the case of experiments under total anesthesia it is difficult to see how the problems raised differ essentially from those of *in vitro* techniques, whereas experiments on the conscious animal must clearly involve an assessment of the animal's psychological state. There seems to me to be a strong case for new legislation recognizing these differences and their implications.

My reason for mentioning this distinction here is that in discussions of the kind represented by Sperlinger's book the point tends to be forgotten.

Taken as a whole, I think this book should be recommended as important reading for those involved in the current debate on new legislation on animal experiments.

*Denis Noble  
Department of Physiology  
University of Oxford*

## CLASSIFIEDS

### Services Available

**Wildlife Management:** Professional services for surveys, reserve development, game ranching, deer farming, translocations, cropping, etc., Dr. J. Henshaw, Wildlife Research Centre, Middle Garland, Chulmleigh, Devon, England.

### Position Available

**ASPCA Publications Editor:** Responsible for writing, editing, and supervising the design, printing, and mailing of bi-monthly newsletter. Also responsible for writing, editing, coordinating production and distribution of Society pamphlets, booklets, flyers, and other publications. Works closely with the Humane Education Department, and also assists other departments in the planning and preparation of relevant publications and special materials (including promotional/marketable items and displays). Maintains ASPCA photography files and works closely with Education Department in expansion of Society's Humane Education Resource Center. Knowledge of animal issues preferable. Reports to Director of Education and ASPCA Executive Director. Salary—mid-teens range with excellent benefit package. Submit resumes to Patricia Hinds, ASPCA Director of Education, 441 East 92 Street, New York, NY 10028.

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**Manuscripts:** — including footnotes, references, tables and figure legends — must be typewritten, double-spaced on 8½ x 11 inch bond paper leaving generous margins. Manuscripts must be in English using the preferred spelling in the *Webster's Third International Dictionary*. Submit original and two (2) copies.

**Manuscript organization:** Title page (pg. 1) containing title of the article (48 characters), author(s), affiliation, present address, address where proofs should be sent; Abstract (pg. 2); Text (begin pg. 3) which includes introduction, methods/procedures, results, discussion, conclusion, acknowledgements, references, tables, and figure legends. Special instructions for the copy editor or printer should be affixed on the original copy.

**Abbreviations and units:** Standard dictionary abbreviations are generally accepted. Other abbreviations should be explained when first mentioned. SI units are preferred.

**References:** The Harvard System, not a numbering system, should be used for the citation of references in the text; e.g., Jones (1971) or (Jones and Smith, 1971) or (Jones *et al.*, 1971). Where more than one paper by the same author(s) has appeared in one year, the reference should be distinguished by 'a', 'b', 'c', etc. (e.g., 1971a). The list of references should be arranged alphabetically by authors' names and chronologically per author. References cited with '*et al.*' in the text should include *all* authors' names in the reference list.

**Titles:** Journals should be abbreviated in accordance with the *Chemical Abstract Service Source Index*. References to books/monographs should include editors, edition/volume number, publisher, city and state/country where published and relevant page numbers. A paper in press may be referenced if it has been accepted for publication. References to personal communications and unpublished work are permitted in the text only.

### *Sample references*

Smith, J. (1970) The effect of stress in swine on meat quality. *J Appl Ethol* 5:125-127.

Smith, J. and Jones, S. (1970) *Animals*, 2nd ed., Academic Press, New York, NY, pp. 8-14.

**Tables:** These should be concise and typed double-spaced throughout.

**Figures:** Submit 3 sets of glossy prints (no negatives) with identifying arrows and letters contrasting sharply with the background. Indicate on the back the author's name, figure number and 'top.'

**Figure Legends:** Captions should contain sufficient information allowing the figure to be clearly understood without reference to the text.

**Types of articles:** The following requirements are given as a guide only; one double-spaced, typed page contains approximately 250 words.

**News and Comment Articles:** 1000-2000 words and where necessary, brief references cited, e.g., (*Appl Ethol* 10:111, 1979) in the text.

**Review Articles:** 5000-8000 words with a comprehensive list of references to be used as source material.

**Original Articles:** Up to 5000 words or long enough to provide an adequate introduction (stating the objective of the study and why it is considered necessary), description of methods (including an outline on the treatment of the research animals and the number of animals used), and combined results/discussion section.

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